

Management Prestart Review Phase 1 for the NIF Optics Assembly Building (OAB)

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October 1, 2000

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Lawrence
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Management Prestart Review Phase 1

for the

NIF

**Optics Assembly Building
(OAB)**



October 2000

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1.0 EXECUTIVE SUMMARY

A Management Prestart Review (MPR) for the National Ignition Facility (NIF) Optics Assembly Building (OAB) was conducted from June, 2000, through October, 2000. This review was performed to determine readiness of the facility and management to transfer the facility from the construction to the commissioning and operations phase. This review process provides assurance that the appropriate line management is in place to effect the turnover. Completion and acceptance of this report constitutes a turnover of facility and equipment operational responsibility from the Beampath Infrastructure System Construction organization to the Assembly Installation and Refurbishment Operations (assembly equipment installation/activation and mechanical cleaning operations) and the Beampath Infrastructure System (BIS) Commissioning and Operations Organizations (conventional facility operations).

The OAB MPR provides to the NIF Project Manager an independent, systematic assessment of:

- Readiness of line management for the turnover to take place,
- Completeness of the equipment and facility installation of the OAB,
- Readiness of personnel to operate within the facility, and
- Implementation and efficacy of key management control processes and procedures.

The MPR process assures that the technical, cost, and schedule risk associated with the installation/activation of OAB special equipment, mechanical cleaning, and conventional facility operations within the OAB are evaluated and are acceptable. Specifically, the scope of the review addresses technical and operational attributes of the equipment and facility systems that have been determined to have significant project risk.

This report implements the LLNL requirement that MPRs shall be conducted before all new facilities are brought into operation, Lawrence Livermore National Laboratory (LLNL) ES&H Manual (M-010), Section 2.2.5, Pre-Start Reviews. The MPR process is an essential part of the ISM work authorization and feedback process. This report documents this process as it pertains to the readiness to install and activate OAB special equipment, perform mechanical cleaning operations, and operate the conventional facility aspects of the OAB.

This review found no deficiencies in the status of the facility and equipment, or the operational readiness that would preclude the turnover process; the operational organizations are equipped to assume management of the facilities. The line management responsibilities for the continued operations in OAB are described in Section 3 of this



report. The environmental, safety and health requirements for the sustained commissioning and operations are discussed in Section 4.

At the same time, the review found 22 elements that need to be addressed in a timely and expeditious manner. These findings are summarized in Section 5 of this report. The Problem Identification and Correction System (PICS) will be used to track these items to closure.

The MPR Committee recommends management responsibilities of the OAB be assumed and authorized to the BIS Commissioning and Operations, and the Assembly and Refurbishment organizations according to the management plan described in Section 4.



2.0 BACKGROUND

The OAB is the primary facility for the final assembly and refurbishment of the line-replaceable units (LRU) of the National Ignition Facility (see *Optics Assembly Building (OAB) SSDR 1.2.2.3 Rev D*, September 29, 1997, NIF-0000551-OD). The OAB is a clean-room facility consisting of:

| | |
|--|--|
| 8,800 ft ² Class 100 20 ± 0.3 ° C | LRU assembly and metrology areas |
| 1200. ft ² Class 1000 20 ± 0.3 ° C | Precision mechanical cleaning area |
| 3200 ft ² Class 10,000 20 ± 0.3 ° C | Mechanical and optics transfer area |
| 1200 ft ² Class 100,000 20 ± 0.3 ° C | LRU OAB to LTAB Transfer area (3 levels) |
| 2800 ft ² General Utility 22 ± 2.0 ° C | Loading dock, mechanical and elec. utility |
| 18,000 ft ² Class 100 20 ± 0.3 ° C | Mechanical loft space for HVAC equip. |

The OAB performs four key functions:

- Precision ultrasonic cleaning of LRU mainframes and components.
- Assembly and refurbishment of the LRUs: Pockels cell, amplifiers, spatial filter towers, spatial filter lenses, and Laser Mirrors 1–8.
- Transport of bottom-loading and top-loading LRUs into transporters for installation into the Laser Building.
- During the construction phase of the Laser Beampath Systems, precision cleaning services for parts and subassemblies for the Beampath Infrastructure System equipment.

The OAB has several Quality Level-2 structures, system and components (see *Optics Assembly Building (OAB) SSDR 1.2.2.3*) primarily associated with safety and environmental controls, i.e., cleanliness control and temperature control:



| Quality Level-1 Items | None |
|-----------------------|--|
| Quality Level-2 Items | <ul style="list-style-type: none">• Primary air circulation and make-up air fans• Chilled water control valves• Steel structure• Fire protection systems• Equipment seismic restraints• Equipment vibration and noise control• Cleanliness, temperature and humidity control systems |

Other OAB process equipment and facility systems included in this review are:

- Mechanical cleaners
- Deionized water system
- House vacuum cleaner system
- Transport and Handling systems and equipment
- Electrical Utility Systems

The hazards in the OAB have been determined to be industrial in nature. A site map with the location of the OAB and the NIF Facility is shown in Figure 1. Floor plans of OAB are included in Appendix A.

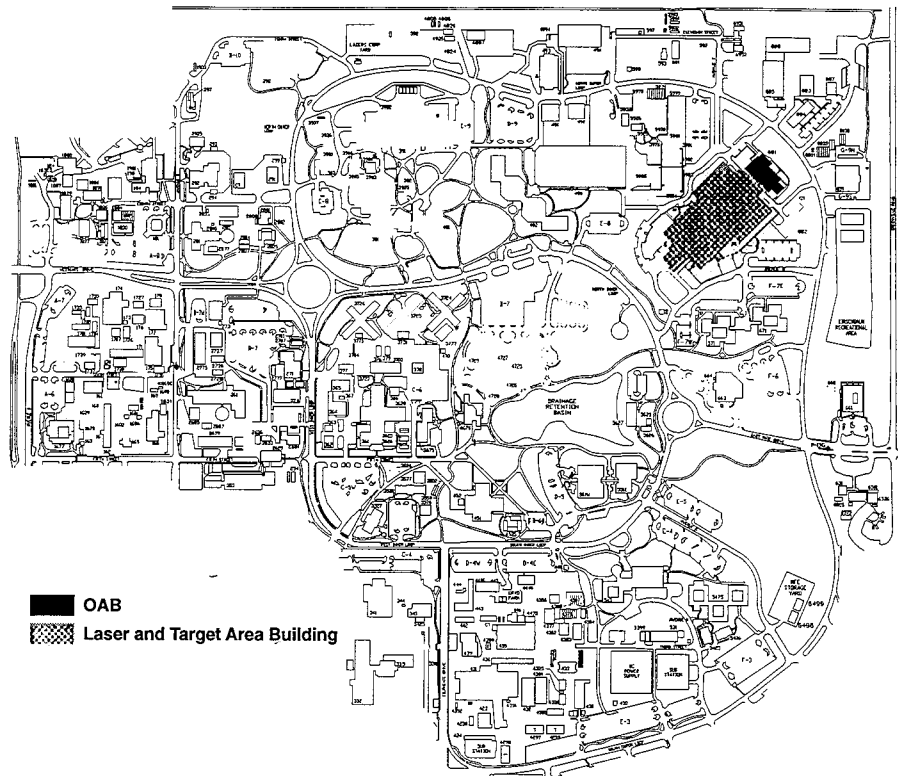


Figure 1. LLNL site map showing the location of the OAB and the Laser and Target Area Building.



3.0 OPTICS ASSEMBLY BUILDING (OAB) MANAGEMENT PLAN

This management plan describes how OAB activities will be managed as the facility transitions from the construction phase to the commissioning/operations phase. The turnover switches line responsibility from the BIS Construction organization to a location/activity-specific combination of the BIS Commissioning and Operations and the Assembly and Refurbishment organizations. The line management structure is shown in Figure 2. The turnover process has included conducting Phase I of the OAB MPR, defining the new line management chain, generating a new set of integrated worksheets (IWS), as well as developing plans for training, qualifications, and procedures.

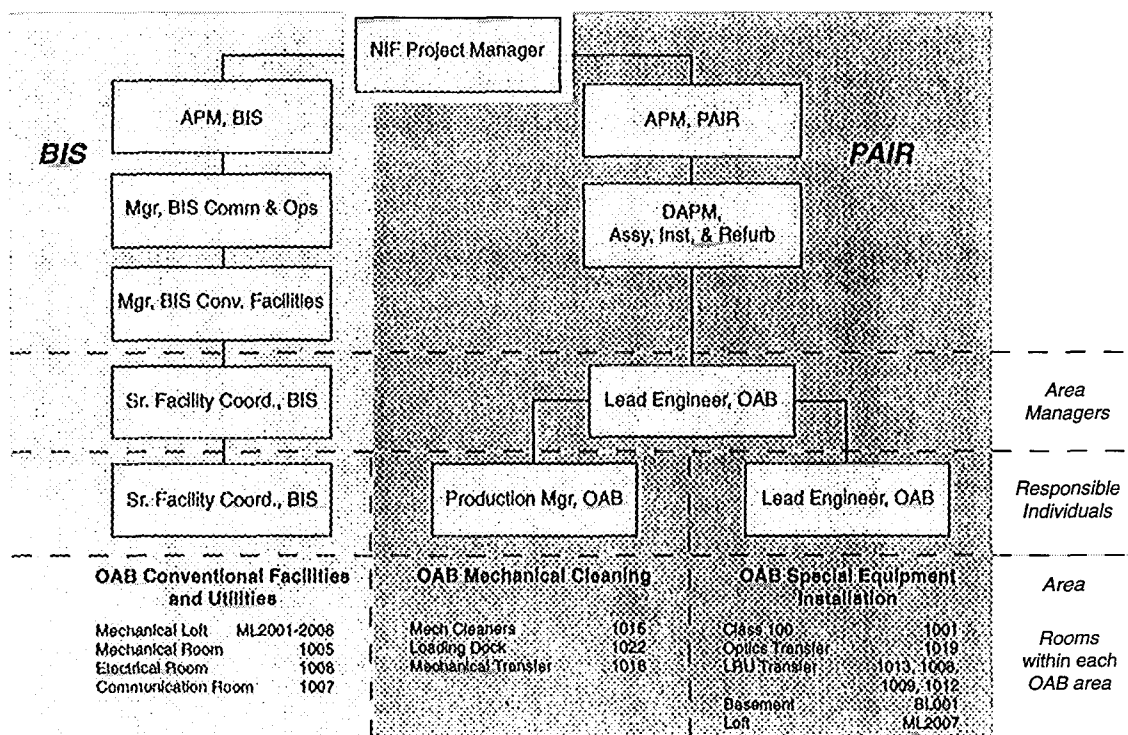
- | | |
|--|--|
| OAB Management | From a management standpoint the OAB is now divided into the following three different scopes of work that break quite cleanly by location within the facility. Room numbers and the management chain for each is shown in the attached chart. The OAB will continue to work under the <i>Construction Safety Program for the National Ignition Facility</i> , September 1, 2000. This involves continuing to comply with site access rules, assigning Area Managers (AMs) for Commissioning/Operations (this is in addition to having a Responsible Individual, which is an LLNL institutional requirement), and continuing to prepare safe plans of actions (SPAs) and job hazard analyses (JHAs). |
| OAB Conventional Facilities and Utilities | This involves operation and maintenance of the heating, ventilation, and air conditioning (HVAC), mechanical, electrical and communication systems (NF3.2). The BIS Operations organization is responsible for this activity which is authorized under IWS 09070002. |
| OAB Mechanical Cleaning Facility | This includes the three mechanical cleaners, the mechanical transfer area and the loading dock (NA2.1.6). Commissioning of the cleaners and cleaning process development is in progress. Qualification cards and draft procedures for cleaner operations are near completion. Formal operations of the cleaning facility will begin with the processing of BIS hardware. The OAB Production group in the Assembly and Refurbishment Organization is responsible for this activity, which is authorized under IWS 09070001. |

**OAB Class 100
Area, Optics
Transfer,
Basement and Loft**

The work done in these areas involves the installation of OAB special equipment (NA2.1, excluding NA2.1.6), including assembly stations, optics insertion devices (NOIDs), verification stations, and docking ports. The OAB Special Equipment group in the Assembly and Refurbishment organization is responsible for this activity, which is authorized under IWS 08220001. After installation and acceptance testing of each workstation or subsystem is complete, a new IWS for the commissioning/operations phase will be generated, and line responsibility will transfer to the OAB Production group.

The outstanding MPR punch list items described in this document will be assigned and tracked in the PICS. The OAB Area Managers will be responsible for ensuring and documenting their completion.

Line Management for the Optics Assembly Building (OAB)



* OAB Facility Point of Contact

9/29/00 GB/rp

Figure 2. Line Management structure for the Optics Assembly Building (OAB).



4.0 ES&H DOCUMENTATION

The following ES&H documents address ES&H aspects of OAB assembly equipment installation, activation and mechanical cleaning activities, and conventional facility operation:

| Document | Purpose |
|--|---|
| Construction Safety Program for the National Ignition Facility, NIF-0001321-OD, UCRL-ID-125990 Rev. 3, September 1, 2000 | This is the governing safety document for work in the facility; it describes the ES&H policies, roles and responsibilities, and the rules that must be followed to perform work. This applies to assembly equipment installation, activation and mechanical cleaning, facility operation, and construction punch list activities. |
| <u>Integration Work Sheets</u> (provided in Appendix D) IWS#09070001 IWS#09070002 IWS#08220001 | An IWS authorizes a specific scope of work. Mechanical cleaning development, mechanical parts cleaning for BIS/NIF OAB facility and facility support equipment operation Installation of assembly equipment in the OAB |
| Job Hazards Analyses and Safe Plans of Action | These will be prepared before work is actually undertaken, in accordance with Project Procedures 5.9 (Preparation and Use of the JHA) and 5.10 (SPA Process). A JHA identifies the hazards and required controls associated with the task steps within a given job. An SPA is prepared just before beginning work, to review the job, hazards, and controls in the context of the work environment that day. |



| | |
|---|---|
| NIF Project Specific Analysis (Appendix I) of the Programmatic Environmental Impact Statement for Stockpile Stewardship and Management, DOE-EIS-0236, September 1996. | This documents environmental impacts of OAB operations. |
| Air Permit S-2127 | This is issued by the Bay Area Air Quality Management District, is for solvent wipe cleaning. |
| National Ignition Facility Storm Water Pollution Prevention Plan, Rev. 5 | This is issued under the National Pollution Discharge Elimination System General Permit No. CAS000002, is for surface water release into the storm sewer. |
| Hazards Analysis Report | This defines the operating envelope for the OAB in terms of hazardous chemical inventories, and other types of hazards and associated controls. It classifies the facility as "General Industry." |



5.0 REVIEW FINDINGS

This review process includes selection of a review committee selected according area of knowledge and expertise related to the design, construction and operation of the OAB. Each reviewer was assigned specific elements to address and for which to provide a written assessment of any findings related to safety and to the realization of the design goals of the facility. The review team for OAB Phase I are:

| Name | Principal Role |
|---|---|
| Vaughn Draggoo, NIF Project | Chairman |
| Bob Murray, LSED Deputy Division Leader | Seismic and Material Handling |
| Brent Ekstrand, AstroPak Corportation | Cleanroom System Design and Operation |
| Glenn Hermes, NIF Operations | Acceptance Testing, Computer Controls |
| Keith Gershon, LLNL Electrical Safety Eng. | Electrical Power Installation and Test |
| Jesse Lum, LLNL Fire Safety Engineer | Fire Protection and Life Safety |
| Mike Trent, LLNL Hazrds. Cntrl. Team 2 | ES&H |
| Don McLamb, NIF Project, Johnson Controls | Training, Equipment Operating Procedures |

Table 2 is a summary of the 22 findings of the review. This table is a listing of NIF-Problem Identification and Corrective Action System (NIF-PICS) items associated with this review. Responsible Managers have been assigned and due dates established (see specific NIF-PICS reports). Detailed assessments associated with these items can be found in the Appendix of the report.

| PICS # | NIF-PICS Title | Responsible Org. |
|----------|---|------------------|
| 20000143 | OAB Phase 1 MPR; Verify CSP-5 As-Built with Red-Lined Field Drawings | BIS |
| 20000145 | OAB Phase 1 MPR; Equipment Seismic Restraints | BIS |
| 20000146 | OAB Phase 1 MPR; Charcoal Prefilters on Recirculation Air Handler Units | PAIR |



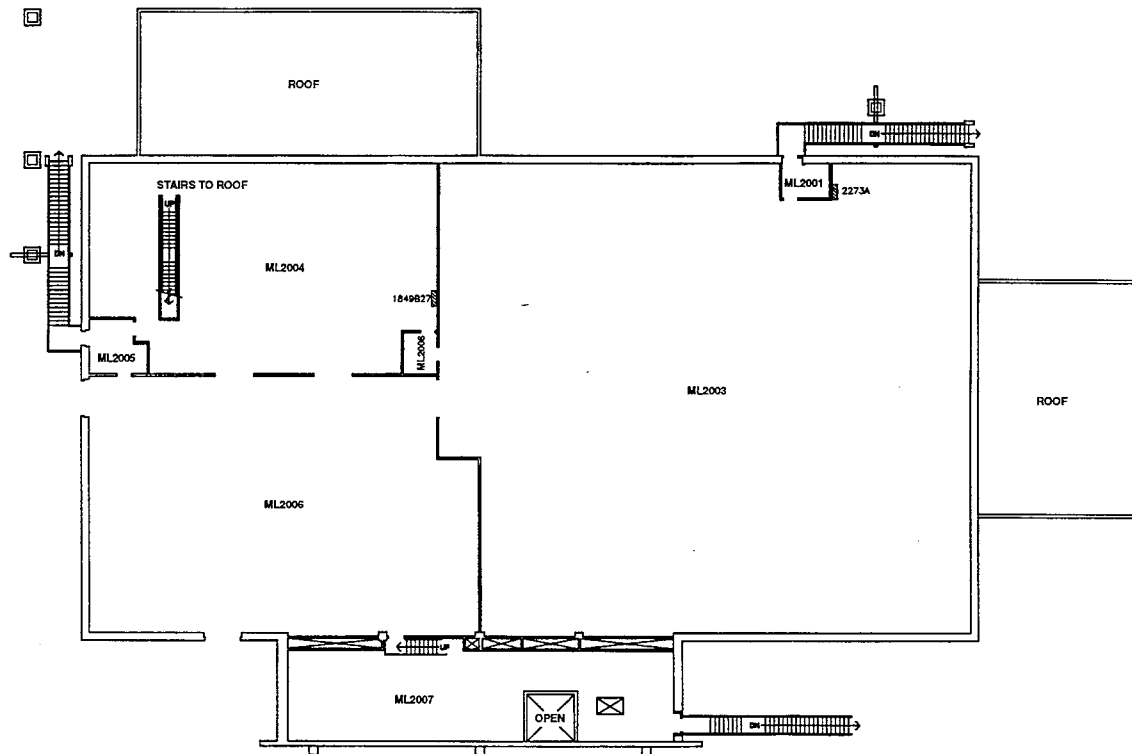
| | | |
|----------|---|------|
| 20000147 | OAB Phase 1 MPR; Realtime NVR Monitor for OAB Operations | PAIR |
| 20000148 | OAB Phase 1 MPR; Cleanroom Certification Document | BIS |
| 20000149 | OAB Phase 1 MPR; Missing Acceptance Report on Variable Frequency Motor Drives | BIS |
| 20000150 | OAB Phase 1 MPR; Building single point Ground Needs to be Controlled | BIS |
| 20000151 | OAB Phase 1 MPR; As-Built documentation of Electrical Power Is Not Accurate | BIS |
| 20000152 | OAB Phase 1 MPR; HVAC Integrate Computer Controls During Fire Alarm Conditions | BIS |
| 20000153 | OAB Phase 1 MPR; Configuration Control of Direct Digital Control (DDC) Software | BIS |
| 20000154 | OAB Phase 1 MPR; Training Plan and Requirements are Incomplete | PAIR |
| 20000155 | OAB Phase 1 MPR; Lift Testing of Lifts, Cranes and Hoists Have Not Been Completed | PAIR |
| 20000156 | OAB Phase 1 MPR; System Specific Training Procedures Have Not Been Completed | PAIR |
| 20000157 | OAB Phase 1 MPR; Personnel Qualification for NIF Specific Equip Is Not Complete | PAIR |
| 20000158 | OAB Phase 1 MPR; Control Logic of Make-up Air/Exhaust Air Needs Review | BIS |
| 20000159 | OAB Phase 1 MPR; Material handling Equipment Acceptance Testing is Incomplete | PAIR |
| 20000160 | OAB Phase 1 MPR; Equipment Operating Procedures | PAIR |
| 20000161 | OAB Phase 1 MPR; Equipment Test Records and Calibration | BIS |
| 20000162 | OAB Phase 1 MPR; Maintenance Plans and procedures | BIS |
| 20000163 | OAB Phase 1 MPR; As-Built Drawings and Documentation | BIS |
| 20000164 | OAB Phase 1 MPR; Conduct of Operations—Lockout and Tag | PAIR |
| 20000165 | OAB Phase 1 MPR; Unreviewed Water Treatment Chemical In Use | BIS |



APPENDIX A

OAB Floor Plans

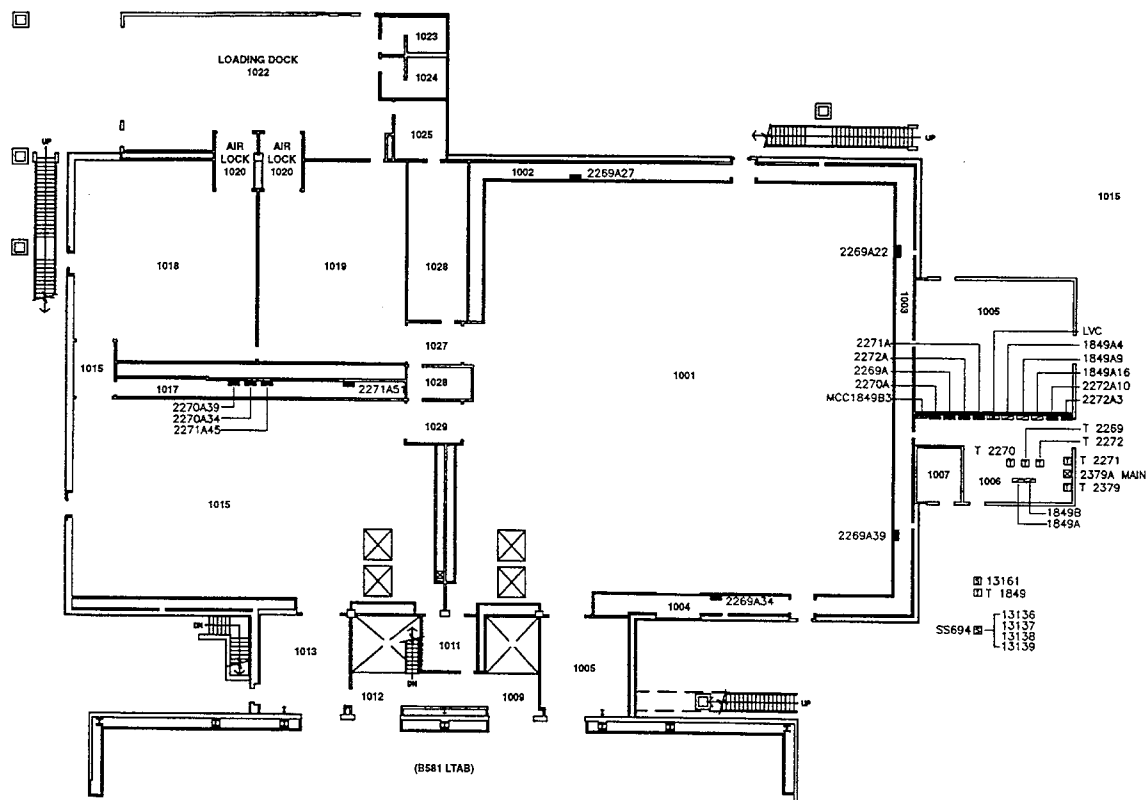
Mezzanine Level



SECOND FLOOR PLAN

40-00-1000-5897

Main Floor

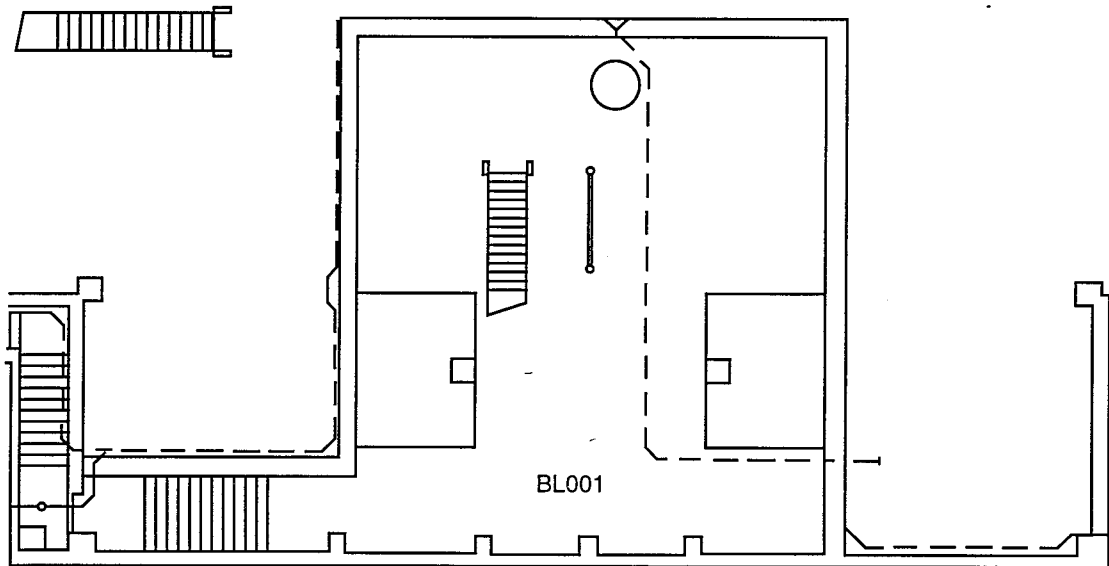


GROUND LEVEL FLOOR PLAN

40-00-1000-5896



Basement.



BASEMENT LEVEL FLOOR PLAN

40-00-1000-5895



APPENDIX B

OAB Line Management

As of October 3, 2000, the following people hold these positions in the OAB Line Management chain.

NIF Project Manager — Ed Moses

| | |
|---|-----------------|
| Associate Project Manager, BIS | Valerie Roberts |
| Manager, BIS Commissioning & Operations | Vaughn Draggoo |
| BIS Conventional Facilities Manager | Len Silva |
| BIS Senior Facility Coordinator | Mark Beyer |
| BIS Senior Facility Coordinator | Mark Beyer |

| | |
|--------------------------------------|---------------|
| Associate Project Manager, PAIR | Jeff Atherton |
| Deputy APM, Assembly, Inst. & Refurb | Gina Bonanno |
| Lead Engineer OAB | Pat Hurst |
| Production Manager, OAB | Gary Edwards |
| Lead Engineer, OAB | Pat Hurst |



APPENDIX C

Review Assessments

| | |
|---|----------------------|
| Review Category: | Review No.: 1 & 3 |
| Facility and Equipment | Review Date: 8/29/00 |
| Review Element: | Reviewer: Bob Murray |
| Structure and Equipment-Seismic Design and Implementation | Page: 1 of 1 |
| Criterion Met? Yes: No: X | |
| Criterion: —Design reviewed and approved —Structural analysis prepared, reviewed, and approved —Structural inspection performed —Independent review of seismic design | |
| Approach: —Conducted facility walk-down 7/18/00 —Conducted seismic walk-down of equipment on 7/11/00 | |
| Discussion of Results: —Except for items noted below, the structure and equipment seismic design requirements have been implemented: | |
| Conclusion: Recommended Corrective Action: First floor equipment room; Deionized Water —Provide lateral support for polish water tanks (group of 4, group of 2) —Provide straps to anchor sodium bisulfate plastic tanks | |



| | |
|---|--------------------------|
| Review Category: HVAC Systems | Review No.:4 |
| | Review Date: |
| Review Elements: Design Review and Implementation, and As-Built Drawings | Reviewer: Brent Ekstrand |
| | Page: 1 of 4 |
| Criterion Met? Yes: X No: : (see Review Category 30, As Built Drawings) | |
| Criterion: Proper design and design execution to provide operational capability of a class 100 clean-room. | |



Approach: Documents and records review

OAB-A8 Operation & Maintenance Manual

Document # 15813 Humidifier Operation & Maintenance Data

OAB-A9 Operation & Maintenance Manual

Document # 15855 (air handler) Pace Operations & Maintenance Data

Document # 15855-02 Clean Pak Operations & Maintenance Data

Document # 15860 Greenheck Operations & Maintenance Data

OAB-A10 Book 1 Direct Digital Controls System Operations & Maintenance Data

Document # 15975 Direct Digital Controls System Operations & Maintenance Data

Section 1 Temperature Controls

OAB-A11 Book 2 Direct Digital Controls System Operations & Maintenance Data

Document # 15975 Direct Digital Controls System Operations & Maintenance Data

Section 3 Temperature Control Panel Components

Section 4 Field Components

Section 5 Control Valves & Actuators

Section 8 Start-up and Commissioning Worksheets

OAB-A14 CleanPak Air Handling Units

Section J (NOTE CONCERN: Flanders Airpure Pleat Prefilters are not impregnated with activated charcoal)

OAB-A18 HVAC Systems: Book 1

Section 1 Temperature Control Drawings

OAB-A19 HVAC Systems: Book 2

Section 3 Temperature Control Panel Components

Section 4 Field Components

Section 5 Control Valves and Actuators

Section 8 Start-up and Commissioning Worksheets

OAB-B2 Commissioning Reports HVAC Final Report

Section 1 HVAC Commissioning Certification

Section 2 Commissioning Procedure for DDC Physical Point Validation

Section 3 Commissioning Procedure for HVAC & DDC Functional Performance Tests

Section 4 Commissioning of HVAC System Balancing and Clean Room Certification (NOTE CONCERN: This procedure addressed air pressures only and specifically did not address cleanliness. It is possible due to nomenclature that this "clean room certification" could be misunderstood to mean a certification per FED STD 209 which addresses particulate cleanliness)

Section 5 Maintenance & Operating Personnel Training

Section 1 Air Apparatus Test Report

Section 2 Air Outlet Test Reports

Section 6 Instrumentation Calibration Report

Section 7 Fan Curves

Section 8 Fan Plans & Room Pressure Readings

NIF Operations Systems Manual Optics Assembly Building HVAC Systems

Personnel Interviews:

OAB Operations Personnel, Gary Edwards; HVAC Operations & Maintenance Personnel, Len Silva

Walk-downs, inspections, observations of activities:

Walk-down & inspection August 7 2000

Discussion of Results:

One concern is a lack of charcoal-impregnated prefilters on the air handlers that re-circulate room air; charcoal prefiltration is used on the makeup air, but not on re-circulating room air. Although the OAB was designed and built with materials that will limit outgassing of non-volatile residue (NVR), the possibility exists that significant levels of NVR may be introduced from personnel and unforeseen events. Using charcoal-impregnated prefilters in the recirculation systems is a good method to continuously remove organic gasses from the air that could later condense on critical surfaces as NVR. The cost of charcoal-impregnated prefilters about four times (4×) that of plain filters.

Two factors must be considered when evaluating the need for charcoal-impregnated prefilters:

The OAB will be used to process very expensive sol gel-coated optics. The expense of the optics, and the economic impact of an optic failure caused by excessive NVR contamination (the expense of system repair, optic replacement, and increased unplanned downtime), may justify the additional expense of installing charcoal-impregnated prefilters on the recirculating air system.

OAB lacks a real-time method for monitoring air levels of organic contaminants that may condense on the optics as NVR. The intention of performing the traditional method of clean-room NVR monitoring, gravimetric NVR determination performed on a witness plate, is adequate for certifying a clean room, but does not alert clean-room personnel to out-of-tolerance or threshold conditions in time to prevent excessive deposition of NVR. The real-time alert is also effective in developing good clean-room technique; by giving immediate feedback, the consequences of personnel behaviors within the clean room is clearly established. Thermal-controlled quartz crystal microbalance (TQCM) and surface acoustic wave (SAW) piezoelectric microbalance are two techniques that can provide the real-time monitoring capability.

The overall design and construction of the OAB is excellent in terms of particulate contamination control and monitoring. In terms of NVR, the design construction and operation of the clean room could be improved.

A second concern is found in the document OAB-B2 Commissioning Reports HVAC Final Report. Section 4 is titled Commissioning of HVAC System Balancing and Clean Room Certification. As it is a common practice to perform periodic clean-room certification for airflow and cleanliness in accordance with FED STD 209, the certification referred to by the OAB-B2 document does not deal with cleanliness.

A third concern is that no As-Built drawings were available at the time of this review (see Review Element 30 As-Built Drawings).



Conclusion:

The HVAC system for the OAB is of sufficient design to maintain a class 100 cleanliness in regard to particulate matter. There is sufficient design airflow and filtration to keep levels of particulate matter below critical limits.

There exists a concern regarding whether charcoal-impregnated prefilters should be installed on the recirculating (room air) air handlers to minimize airborne NVR contaminants.

Recommended Corrective Action:

Consider installing charcoal-impregnated prefilters on all room air recirculating air handlers.

A second related concern is whether a real-time airborne NVR monitoring system should be used. There are several methods of real-time airborne NVR monitoring. TQCM and SAW piezoelectric microbalance techniques are available.

Recommended Corrective Action:

Install real-time airborne NVR monitoring equipment and tie in to alarm system so that OAB clean-room personnel may receive immediate feedback if excessive airborne NVR is detected.

A final concern is whether documentation nomenclature may cause confusion as to what tests were performed during clean-room certification

Recommended Corrective Action:

Retitle document to indicate true scope of certification (air pressure & flow only).



| | |
|--|--------------------------|
| Review Category | Review No.: 4 |
| Equipment-- HVAC System | Review Date: |
| Review Element: | Reviewer: Brent Ekstrand |
| Acceptance Testing | Page: 1 of 1 |
| Criterion Met? Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/> | |
| Criterion: All appropriate and necessary HVAC acceptance tests completed satisfactorily. | |
| <p>Approach: <i>Documents and records review.</i></p> <p>OAB-A19 <u>HVAC Systems: Book 2</u></p> <p>Section 3 <u>Temperature Control Panel Components</u></p> <p>Section 4 <u>Field Components</u></p> <p>Section 5 <u>Control Valves and Actuators</u></p> <p>Section 8 <u>Start-up and Commissioning Worksheets</u></p> <p>OAB-B2 <u>Commissioning Reports HVAC Final Report</u></p> <p>Section 1 <u>HVAC Commissioning Certification</u></p> <p>Section 2 <u>Commissioning Procedure for DDC Physical Point Validation</u></p> <p>Section 3 <u>Commissioning Procedure for HVAC & DDC Functional Performance Tests</u></p> <p>Section 4 <u>Commissioning of HVAC System Balancing and Clean Room Certification</u></p> <p>Section 5 <u>Maintenance & Operating Personnel Training</u></p> <p>Section 6 <u>72 Hour Endurance Test</u></p> <p>Section 7 <u>Specialty (non-HVAC) Equipment</u></p> <p>Section 8 <u>Appendix</u></p> <p>OAB-B2 <u>Air & Water Balance Reports</u></p> <p>Section 1 <u>Air Apparatus Test Report</u></p> <p>Section 2 <u>Air Outlet Test Reports</u></p> <p>Section 6 <u>Instrumentation Calibration Report</u></p> <p>Section 7 <u>Fan Curves</u></p> <p>Section 8 <u>Floor Plans & Room Pressure Readings</u></p> <p><i>Personnel interviews.</i></p> <p>HVAC Operations and Maintenance Personnel</p> <p>Walk-downs, inspections, observations of activities.;N/A</p> | |



Discussion of Results: Acceptance testing is well documented. One test result is missing. There is no evidence of the manufacturer's acceptance test of the Variable Frequency Drivers (VFD). There is post-installation field testing of the VFDs documented.

Conclusion: Criteria are met.

One concern is the missing documentation of the manufacturer's acceptance testing of the VFD. Subsequent field testing of the units has been performed.

Recommended Corrective Action:

Contact manufacturer and determine if acceptance test performed. If not performed, there is no problem as post-installation field testing has been performed satisfactorily.



| | |
|--|-------------------------|
| Review Category: | Review No.: 8 |
| Equipment—Electrical Power Systems | Review Date: |
| Review Elements: Design reviewed and approved, Acceptance Testing, As-Built Drawings and Warning Signs | Reviewer: Keith Gershon |
| | Page: 1 of 2 |
| Criterion Met? Yes: No: X | |
| <p>Criterion:</p> <p>Specification and design review and approval is documented</p> <p>Independent tests prepared and executed</p> <p>As-Built drawings available and verified to field drawings and field inspection</p> <p>Field signage is consistent with LLNL requirement</p> | |
| <p>Approach:</p> <p>Review OAB electrical plans, specifications, and panel diagrams.</p> <p>Walk-down of OAB electrical room with Mark Beyer, 8-16-00.</p> <p>Review Submittal 16965 3.05C; Electrical Acceptance Certified Test Reports.</p> <p>Review of As-Built Drawing submittal for A.C. Martin</p> | |
| <p>Discussion of Results:</p> <p>The design of the OAB electrical power distribution was reviewed and approved. The design meets design requirements in the plans and specifications; electrical System meets criteria.</p> <p>All tests are satisfactory.</p> <p>Barriers and warning signs are installed in accordance with the criteria.</p> <p>Peripheral issues are noted concerning configuration control of the grounding system. Variable speed motor drivers require robust harmonic filters to function properly Future OAB reviews should be aware of potential problems that may arise via the use of non-NRTL-approved equipment. This is not a problem with the equipment being considered in this report.</p> <p>As-built documentation from A. C. Martin for CSP-5 is not consistent with fielded equipment. The reason for this has not been determined. Subsequent work of CSP-17 may have modified the field equipment that is not consistent with CSP-5 As-Built. Cross check of CSP-5 As-Built with Field Redlines has similarly not been accomplished. Field electrical panel schedules have been updated by Plant Engineering to be consistent with actual field equipment.</p> | |



Conclusion:

Criteria for design review, testing, and barriers and warning signs are met.

As-built drawings as received from A.C. Martin are not consistent with actual field equipment.

Recommended Corrective Action: Complete the As-Built verification process especially for field panel schedules and field equipment (see Review Element 30 "As_Built Drawings").

Recommended Corrective Action: Grounding block should be secured and labeled in some way to prevent tampering.



| | |
|---|------------------------|
| Review Category: | Review No.: 9 |
| Equipment—Communication Systems | Review Date: 9/1/00 |
| Review Element: | Reviewer: Glenn Hermes |
| Emergency Paging, Fire Alarms, and General Building/Facility Communication Systems | Page 1 of 2 |
| Criterion Met? Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/> | |
| <p>Criterion:</p> <p>The OAB is classified as an industrial occupancy facility as specified by the NFPA 101, Life Safety Code. This type of facility must include a fire/emergency notification system. The OAB fire alarm system will be monitored by the LLNL Fire Central Dispatch system.</p> <p>NIF Operations requires adequate communications systems to support routine facility operations and emergency communications, if required. Regular telephone service has been installed to facilitate general and emergency communication. NIF Operations personnel will also utilize cell phones, alpha pagers, and 2-way radio communications as appropriate.</p> | |
| <p>Approach:</p> <p>Personnel interviews. Completion or current status of these items was discussed or verified with a HC Team 2 Fire Protection representative, Plant Engineering representative, or NIF Facility representative.</p> <p>Walk-downs, inspections, observations of activities. The reviewer also used observations of activities and walk-downs to confirm some items.</p> | |

**Discussion of Results:**

The emergency paging and fire notification system has been installed and tested by the vendor. In general this system works, but during final connection and testing by LLNL Plant Engineering, it was discovered that some of the device wiring was done incorrectly. Some of the devices were connected in a way that allowed them to work, but the central LLNL monitoring system would not be able to detect if they were disconnected from the system. Before Plant Engineering can issue a Certificate of Completion, this wiring error needs to be corrected. During preliminary testing of the fire alarm system, it was discovered that the HVAC system for the OAB would completely shut down during a smoke alarm. This response needs to be carefully evaluated from a cleanliness and safety standpoint. Further testing of the fire alarm system has been postponed until this evaluation can be performed.

Proper installation and operation of the telephone system was confirmed by this reviewer, although, no telephones are installed in the mechanical loft. Operations personnel report that cell phones work erratically in the OAB. There is no plan to improve cell phone performance at this time. The OAB is not connected to the general use building paging system, and there currently is no requirement or plan to use the general building page in the OAB. The ability to use radios and pagers in the OAB is currently limited due to poor reception. Radios and pagers should work properly when the main radio system is installed in the LTAB and OAB. Currently this system is not scheduled for installation until mid-2003. OAB personnel are looking into moving up the purchase and installation schedule for this equipment.

Conclusion:

The current installation and planned upgrades to the communications systems appear to be adequate for current OAB safety and operations. The general use telephone system has been installed and is in routine use. Radios and pagers for use during routine operations currently do not work adequately. The planned future installation (mid 2003 or sooner) of the main radio system in the LTAB and OAB will correct this issue. Currently there is no plan to connect to and use the general building page system in the OAB.

The fire notification and emergency paging system has been installed and has been tested. Wiring errors have been corrected and final tests completed. A Certificate of Completion for the emergency paging have been issued.



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| Review Category: | Review No.: 10 |
| Equipment– Integrated Computer Control (ICC) | Review Date: 2/15/00 |
| Review Element: | Reviewer: Glenn Hermes |
| Design Reviewed and Approved | |
| Implemented, Tested and Verified | Page 1 of 3 |
| Criterion Met? Yes: No: X | |
| <p>Criterion:</p> <p>The criteria for the OAB conventional facilities are specified in Specification OCS-0073, CSP 5 for the Optics Assembly Building, Number B341118, and associated drawings. The Sequence of Operation and Operating Parameters were specified within this document and associated drawings to meet LLNL System Design Requirements for the OAB. Yamas Controls Inc. designed their control logic and block programming to meet these requirements.</p> <p>Yamas Control Inc. is responsible for the programming and implementation of the integrated computer controls for the OAB. This system is dedicated to the integrated operation of the OAB HVAC equipment. The system monitors two safety-related inputs from the OAB consisting of the fire alarm monitor and the oxygen deficiency monitor. The integrated control system monitors and controls overall OAB HVAC system operations to assure proper temperature and humidity of the building. The system monitors various sensors to determine flow, temperature, speed, valve positions, and pressure differential to automatically determine what equipment needs to be turned on, off or have operating parameters changed to maintain the required temperature and humidity.</p> | |
| <p>Approach:.</p> <p>Documents and records review. Yamas Central OAB As-Built, Programming and Commissioning submittal, and the Sherrill Engineering HVAC Commissioning Report for the OAB.</p> <p>Personnel interviews. Test procedures, requirements, and verifications were discussed or reviewed with Jacobs Q/A Inspectors, the Plant Engineering Commissioning representative, or the Yamas Controls Project Manager. System performance and operations tests were also performed by NIF Facility representatives.</p> <p>Walk-downs, inspections, observations of activities.</p> | |

**Discussion of Results:**

During the control system installation, Yamas performed a detailed check out of each point-to-point connection within the cross connect panels. During commissioning, Yamas performed another detailed check, including point validation, point configuration and calibration. A record of these checklists, detailed program logic, I/O point assignments and designations, and control drawings are included in the Yamas OAB As-Built, Programming, and Commissioning submittal.

The control tests were witnessed and verified by the commissioning contractor, Sherrill Engineering. Sherrill Engineering performed tests to supplement the Yamas tests for the purpose of verifying the equipment capacity performance and DDC control performance in both the normal and alarm operation modes. Sherrill Engineering also performed a test of the DDC Graphics System to verify graphic accuracy, data I/O points, and adjustment capability. The Sherrill Engineering tests and verifications are documented in the Commissioning Final Report for the OAB. The Yamas Controls and Sherrill Engineering reports have been provided to NIF Program and Plant Engineering personnel.

In addition to construction and activation tests, NIF Facility personnel in coordination with Yamas Controls performed a detailed series of operation and performance tests.

The fire alarm input was tested, as an integrated system, from the alarm sensors all the way through the DDC and verified to shut down the HVAC fans.

Conclusion:

The test procedures and documentation appear to be thorough and complete. The tests were reviewed and verified by the OAB commissioning contractor, Sherrill Engineering. The procedures and tests provided verification of criteria specified in OCS-0073 and associated drawings. Control system As-Built drawings and programming information has been given to NIF Program and LLNL Plant Engineering personnel.

Currently the entire air handling system (HVAC) for the OAB is shut down by a fire alarm. This response needs to be carefully reviewed by the LLNL Fire Chief and NIF Program personnel to determine if this is the correct response from a life safety and facility cleanliness concern.

Recommended Corrective Action:

Fire Safety, NIF personnel, and Plant Engineering need to review and determine the proper response for the HVAC to a fire alarm and implement the appropriate controls.

There is currently no formal configuration control process in place for control of the HVAC DDC logic, setpoint, and graphical software configurations. These systems are modified as required by experts in the field with no formal process in place. The current process relies on the experts to follow through with system documentation and as built markups. There is a very preliminary process under development that has not been implemented as of this date. This process needs to be reviewed and NIF management needs to determine the requirements for a formal configuration control policy for these systems.

Recommended Corrective Action:

The DDC Software Configuration Control process currently under development by Plant Engineering and NIF Conventional Facility Operations needs to be reviewed, completed, and implemented.



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| Review Category: | Review No.: 15 |
| Equipment—Fire Protection Systems and Life Safety Provisions | Review Date: |
| Review Element: | Reviewer: Jesse Lum |
| Fire Protection Design Review and Approved | Page: 1 of 2 |
| Installation verified, tested and documented | |
| As-Built's Verified | |
| Life Safety Items in Place (emergency lighting, etc.) | |
| Criterion Met? Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/> | |
| Criterion: The criteria for the OAB conventional facilities are specified in Specification OCS-0073, CSP-5 Optics Assembly Building. Title 1 and 2 specifications and drawings were reviewed prior to construction. | |
| Approach: Documents and records reviewed. NIF Optics Assembly Building CSP-5 100% Title 2 Specifications and Drawings. Contractor shop drawings for fire protection systems. Personnel interviews with NIF Conventional Facilities Design Manager, NIF OAB Facilities Representatives, LLNL Plant Engineering Industrial Electronics personnel and Contractor representatives for fire protection systems. Walk-downs, inspections, observation of activities. Participated in final walk-through for OAB 11/9/99. Comments submitted to OAB Construction Manager. Witnessed tests of fire alarm system by Contractor (Siemens) 4/4/00. Witnessed test of fire sprinkler system by Contractor (Superior Automatic Sprinkler Co.) 12/8/99. | |
| Discussion of Results: Fire Alarm System: Fire alarm system acceptance test by Contractor (Siemens) witnessed by the ES&H Team 2 Fire Protection Engineer (Representative of the Authority Having Jurisdiction) as required. Certificate of Completion is on file. [Confer with Ralph Warner (Industrial Electronics) of Plant Engineering for installation and test of Emergency Notification System]. Fire Sprinkler System: Fire sprinkler system acceptance test by Contractor (Superior Automatic Sprinkler Co.) witnessed by the ES&H Team 2 Fire Protection Engineer (Representative of the Authority Having Jurisdiction) as required. Contractor's Material and Test Certificate is on file. Portable fire extinguishers installed September 1999 by LLNL Fire Extinguisher Service Technician under direction of ES&H Team 2 Fire Protection Engineer. Emergency lighting as required by NFPA 101, Life Safety Code tested on 1/28/00. <i>As-Built drawings for fire protection systems are on file with NIF Conventional Facilities Design Manager and will be entered into the NIF Sherpa System (see Review Element 30).</i> | |



Conclusion:

The fire protection systems have been installed as specified and tested to ensure operation as designed. Records of tests and As-Built drawings and documents are on file. No outstanding fire protection issues remain.



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| Review Category: | Review No.: 16 |
| Equipment—Material Handling Equipment | Review Date: 8/28/00 |
| Review Elements: | WBS: |
| Design reviews | Page: 1 of 1 |
| Engineering safety notes | |
| Load tests completed | |
| Criterion Met? Yes: No: X | |
| Criterion: —Design reviews completed and approved —Engineering safety notes completed and approved —Load tests completed | |
| Approach: —Documents and records review of MPR binders —Personnel interviews with Pat Hurst, Henry Wong, J. B. McLeod, and Jim Davin —Meeting with John Reed, NIF Rigging Engineer, on load test requirements specified in National Standards | |
| Discussion of Results: The following material handling equipment has been identified as required for Phase I. The table lists the status of the design reviews, any safety notes, and required load tests. | |
| <u>Equipment Item</u> | <u>Design Review</u> |
| <u>Air Lock Lift</u> | <u>Complete</u> |
| <u>Vertical Lifts (2)</u> | <u>Complete</u> |
| <u>Ergo Techs (3)</u> | <u>Complete</u> |
| <u>Large Parts Cleaners</u> | <u>Complete</u> |
| <u>Small Parts Cleaners</u> | <u>Complete</u> |
| <u>Bridge Crane</u> | <u>Complete</u> |
| <u>Airlock Jib Crane (2)</u> | <u>Complete</u> |
| <u>Gross Cleaning Jib Crane</u> | <u>Complete</u> |
| <u>Safety Note</u> | <u>Load Test</u> |
| <u>Not Req.</u> | <u>10@125%</u> |
| <u>Not Req.</u> | <u>10@125%</u> |
| <u>Not Req.</u> | <u>10@125%</u> |
| <u>Not Req.</u> | <u>10@125%</u> |
| <u>Not Req.</u> | <u>1@125%</u> |
| <u>Not Req.</u> | <u>1@125%</u> |
| <u>Not Req.</u> | <u>1@100%</u> |
| This review addresses only equipment associated with Phase I. Many safety notes and additional load testing is required for Phase II activities | |



Conclusion:

Recommended Corrective Action:

Complete Load tests identified above before this equipment is considered operational.
Recommend locking-out equipment pending these tests.



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| Review Category: | Review No.:17 |
| Equipment—Worker Protective Equipment | Review Date: |
| Review Element: | Reviewer: Mike Trent |
| Equipment identified and approved | Page: 1 of |
| Protective Equipment available (eye wash, gloves) | |
| Procedures for use and training requirements | |
| Criterion Met? Yes: X No: | |
| Criterion: | |
| Approach: Documents reviewed: N/A | |
| Personnel Interviewed: N/A | |
| Inspections/Observations: | |
| Facility walkdown by HC professionals | |
| Discussion of Results: | |
| The Gastech oxygen deficiency alarm system is not being maintained. | |
| The noise survey was conducted in the OAB mechanical room, which houses the central vacuum system. The survey found noise ranging from 85 to 95 dB, which an average of 88db. | |
| Conclusion: | |
| As there is no near term plan to use asphyxiant hazardous gas, the Gastech sensor should be shut off and labeled. | |
| Noise Hazard signs are in place. | |
| The necessary warning signs for confined spaces have been installed. | |



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| Review Category: Personnel—Training Program, Plan and Procedures | Review No.: 21 |
| | Review Date: 09/01/00 |
| Review Elements: Training Plan Requirements defined, reviewed and approved Training procedures | Reviewer: Don McLamb |
| | Page 1 of 4 |
| Criterion Met? Yes: No: X | |
| <p>Criterion: The training for operation of OAB, Phase 1 emphasis is on general industrial safety and environmental controls. Training is required for operation and maintenance of HVAC Systems (Air circulation, chilled & hot water, DDC), Deionized water, Mechanical Cleaners, Vacuum Cleaners, and Transportation and Handling Equipment (lifts, cranes, hoists).</p> <p>Review elements for Training Plan are:</p> <p>(1) Training Plan meets Institutional requirements.</p> <p>(2a) Training requirements defined</p> <p>(2b) Training requirements reviewed and approved.</p> <p>(3) Training Plan and Procedure approved.</p> <p>(4) Training Plan reflects (IWS) requirements</p> | |



Approach: The method(s) used to conduct the review of this element included the following:

I Documents and records review:

NIF Operations Training Plan, NIF-0038026, 17May 2000.

Assembly and Refurbishment Plan, Volume 1, 7/21/00.

Systems Operations Manual; HVAC Systems; DI Water;

Vendor Documentation in Systems Manuals; OAB-A7 Through OAB-A20.

Procedure 5.1, Content of O&M Procedures.

Qualification Card for "Operator OJT for the NIF OAB"

Qualification Card for Optics Processing, Facility Cleaning

Draft of Plant Engineering, Optics Assembly Building.

IWS for Installation of assembly equipment in the OAB

IWS for mechanical cleaning development

IWS 111599-03, for installation of Special equipment for OAB

"Volumes for MPR review":

Bridge Crane and Jib Crane.

ERGOTECH optics insertion mechanism.

NOID (New Optics Insertion Device).

The Laboratory Facility Charge Funded Services Plan for the OAB, this addresses maintenance of cranes, elevators, roll-up doors, mechanical equipment, facility electrical, lighting, industrial electronics (e.g. Fire system), High voltage (13.8 KV) and stand by power. Training requirements are identified through the work authorization process per NIF requirements.

OAB protocol training, Clean-room maintenance, repair, & installation (Trained 8/30/00)

Laser Programs ISM Guide.

II Personnel Interviews; Len Silva, George Riehl, Gary Edwards, Kim Doran, Chuck Ellerbee, Jim Foye.

III OAB Walk-down on 7/27/00



Discussion of Results:

The NIF Training plan identifies the process for providing training for operations. Specific equipment or subsystems requiring training are not identified. The Training Plan is not approved. The training procedure (Qual Card for Operator OJT for the NIF OAB) did not indicate that it had been reviewed and approved. Reference is made to ISM and IWS. The *Health & Safety Manual*, *Safety Analysis Report* and *Technical Safety Requirements* are referenced. Plant Engineering has provided a list of responsible individuals (trained) by craft and has indicated that some tasks need programmatic training support.

The Assembly and Refurbishment Step Plan identifies the required training, qualification and procedures processes. Clean-room cleaning and clean-room protocol training procedures have been prepared. Four procedures and training documents are in preparation with completion dates before the end of September.

The Systems Operations Manuals for HVAC Systems and DI Water Systems look complete enough for successful training in systems operations. They do follow NIF Procedure 5.1, Preparation, Content and Distribution of Operations and Maintenance Procedures. Maintenance plans are included. Some procedures are identified as being under development.

Vendor provided documentation in OAB-A7 through OAB-A20 provides operations and maintenance information that would help resolve most training needs if incorporated into training plans and procedures.

The Qualification Card for OAB HVAC operations documents on-the-job training for normal, off-normal, shut-down, & start-up activities. It references NIF HVAC Maintenance Procedure NIF-500539 and NIF HVAC Operating Procedure NIF-500539, plus NIF-5004846 Lock Out Tag Out. The specific NIF Operations and Maintenance Procedures are contained in the Systems Manuals for HVAC and DI Water.

The Optics Processing, Facility Cleaning Qualification Card needs to be completed and reviewed/approved. It is in good form in some areas such as Prerequisites, Corequisites and Required Reading.

Clean-room protocol training is in place and is being provided.

Walk-down of the OAB utilities showed that the systems are being operated under clean conditions with adherence to clean environment protocols.

The Plant Engineering Volume contains Preventative Maintenance procedures for most of the systems of concern. The maintenance plan provides a list of the equipment and systems that have personnel trained per NIF requirements. Not yet completed are the maintenance plans for the mechanical cleaners.



Conclusion:

The Training Program Plans and Procedures for Phase one of the OAB should be expanded, identifying all of the Operations and Maintenance Training Plans and Procedures required to reliably perform the OAB mission. These documents require Management review and approval.

For Phase One, Training Plans and Procedures are needed for vacuum cleaners, mechanical cleaners and transport/handling (lifts, cranes & hoists) equipment.

Vendor provided documentation looks good. It is tied into System Training/Operation/Maintenance documents in some areas; further tie ins are needed.

Qualification Cards for "OJT for the NIF OAB" and for "Optics Processing/Facility Cleaning" need to be completed, reviewed and approved. Qualification Cards need to be completed covering electrical, compressed air, DI water, mechanical cleaners, and transport/handling equipment.

The Plant Engineering training plans and procedures need to be completed, reviewed and approved.

Training is considered adequate to continue build-up in the OAB but significant improvement is needed prior to committing the OAB for operational support.

Recommended Corrective Action:

Completion, with management review and approval, of a training program plan that identifies procedures required.

Recommended Corrective Action:

Complete Training plans and Procedures for:

HVAC systems including DDC (review & approval)

D I water (review & approval)

Transporter lifts

Vacuum cleaner

Mechanical cleaners; Gross Cleaner, and Large and Small Part Precision Cleaners



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| Review Category: | Review No.: 22 |
| Personnel—Training and Qualification Records | Review Date: 09/01/00 |
| Review Elements: | Reviewer: Don McLamb |
| Training requirements completion | Page 1 of |
| Training records | |
| Personnel qualifications | |
| Criterion Met? Yes: No: X | |
| Criterion: Training Requirements completed and documented; Training records consistent with IWS requirements; Operators meet Qualifications & this fact documented; Personnel qualifications established and approved. | |



Approach: The method(s) used to conduct the review of this element included the following:

I Documents and records review:

NIF Operations Training Plan, NIF-0038026, 17May 2000.

Assembly and Refurbishment Plan, Volume 1, 7/21/00.

Systems Operations Manual; HVAC Systems; DI Water;

Vendor Documentation in Systems Manuals; OAB-A7 Through OAB-A20.

Procedure 5.1, Content of O&M Procedures.

Qualification Card for "Operator OJT for the NIF OAB"

Qualification Card for Optics Processing, Facility Cleaning

Draft of Plant Engineering, Optics Assembly Building.

IWS for Installation of assembly equipment in the OAB

IWS for mechanical cleaning development

IWS 111599-03, for installation of Special equipment for OAB

"Volumes for MPR review":

Bridge Crane and Jib Crane

ERGOTECH optics insertion mechanism.

NOID (New Optics Insertion Device).

The Laboratory Facility Charge Funded Services Plan for the NIF OAB includes cranes, elevators, roll-up doors, mechanical equipment, facility electrical, lighting, industrial electronics (e.g. Fire system), High voltage (13.8 KV) and stand by power identified as qualified per NIF requirements.

OAB protocol training, Clean room maintenance, repair, & installation (Trained 8/30/00)

Laser Programs ISM Guide.

II Personnel Interviews; Len Silva, George Riehl, Gary Edwards, Kim Doran, Chuck Ellerbee, Jim Foye.

III OAB Walk-down on 7/27/00

Discussion of Results

Qualification cards are in progress. Two have completed the HVAC Operator OJT for the NIF OAB: Martin Johnson and Mark Beyer

Training in clean-room protocols has been completed for 152 people. These include the Plant Engineering maintenance support personnel. Gary Edwards maintains the master list of those trained. Training for two personnel in HVAC Operator OJT is completed and copies of the Qual cards filed in the Systems Manual. Training in all other systems has not been provided or not documented.



Conclusion:

Training requirements have been met for 152 persons in clean-room protocols and for two persons in OAB Operator OJT. Trained maintenance personnel from plant engineering are identified in all systems not unique to NIF such as the mechanical cleaners. Plans and procedures required for training and qualification in all other areas are in preparation. Training processes must continue until all systems are completed. In all areas, except clean room protocols and operator OJT, this must await completion of training plans and procedures.

General Safety Training is satisfied. Equipment-specific training is considered adequate to continue build-up in the OAB, but significant improvement is needed prior to committing the OAB for operational support.

Recommended Corrective Action:

When training documentation has been prepared, reviewed and approved, and training is provided, Training and qualification records are needed for:

DI water

Transporter lifts

Vacuum cleaner

Mechanical cleaners: Large and Small Parts Precision Cleaners and Gross Cleaner



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|---|---------------------------------------|
| Review Category: Equipment—Acceptance Testing Procedures (ATPs) | Review No.: 24 Review Date: 9/1/00 |
| Review Element: ATP's developed, reviewed and approved ATP's completed and deficiencies documented Design criteria validated | Reviewer: Glenn Hermes Page 1 of 7 |
| Criterion Met? Yes: No: X | |
| <p>Criterion:</p> <p>ATPs for both conventional facilities and Project process equipment are covered in this section.</p> <p>The criteria for the OAB conventional facilities are specified in Specification OCS-0073, CSP 5 for the Optics Assembly Building, Number B341118, and associated drawings. Factory checklists and representatives were used for startup and checkout of most of the primary equipment. Additional criteria and checklists were developed by Sherrill Engineering, the general commissioning contractor for the OAB.</p> <p>The criteria for the Project process equipment included in this review is specified as indicated below:</p> <p>Mechanical Parts Gross Cleaner – PO B507568</p> <p>Small Mechanical Parts Precision Cleaner Equipment Specification (NIF- 0005752)</p> <p>Large Mechanical Parts Precision Cleaner Equipment Specification (NIF-0004446) (includes the criteria for the secondary de-ionized water system)</p> <p>Loft Bridge Crane Specification for the OAB (NIF- 0004242)</p> <p>Three jib cranes, specified in Jib Crane Specification for the OAB (NIF - 5000696)</p> <p>OAB LRU Transporter Specification (NIF – 0002477)</p> <p>Ergotechs-Rotating Assembly Table Requirements , M. Simmons, 4/14/97</p> <p>2 - Vertical lifts (Vertical Lift Specification for the OAB (NIF-0002773)</p> <p>1 - Vertical lift (Airlock Vertical Lift Specification for the OAB (NIF-0002858)</p> | |
| <p>Approach:</p> <p>Documents and records review. Factory and field test submittals, and the Sherrill Engineering Commissioning report as noted in the Discussion section.</p> <p>Personnel interviews. Jacobs Q/A Inspectors, the Plant Engineering Commissioning representative, and the Yamas Controls Project Manager.</p> <p>Walk-downs, inspections, and observations of activities.</p> | |



Discussion of Results:

Conventional Facilities Equipment

The primary equipment in the OAB including HVAC Systems, Deionized Water System, Vacuum Cleaning system, and Building Paging System were activated by the equipment manufactures. Manufacture representatives verified proper installation, checked equipment safety systems, and verified proper operation. In general the equipment startup and testing was witnessed by a Jacobs QA inspector.

In addition to the factory tests and field tests, Sherrill Engineering was contracted to certify the commissioning of the OAB HVAC systems including the following:

Equipment and Material Installation

Equipment Startup

Equipment Vibration Tests

Equipment Capacity Tests

Air and Hydronic System Balancing including Clean Room Pressurization Tests

Clean Room Certification Tests

DDC Physical Point Validation and Sensor Calibration

DDC Software Programs Including Trouble /Failure Alarms

DDC Graphical User Interface Configuration

HVAC System Functional Performance Tests

72 Hour Endurance Test

The final Testing, Adjustment, and Balancing of the HVAC systems was performed by Thermoscope, Inc., and considered acceptable by Sherrill Engineering.

The final Clean Room Certification was performed by Micro-Test, Inc. (submittal 15990-010) and considered acceptable by Sherrill Engineering.

A 72-Hour Endurance Test from March 14-17, 2000 was performed by Sherrill Engineering. In addition to verifying the temperature stability during these tests, the MAU-1 humidification and dehumidification modes were also tested.

DDC Control Point tests and calibrations were performed jointly by Yamas Controls and Sherrill Engineering.

These tests are documented in the Sherrill Engineering submittal, Section 01810 Commissioning Final Report for the OAB, April 14,2000.

HVAC equipment vibration tests were performed by Vibration Engineering Consultants, (submittal 15855-020) and LLNL, Summary Report of 1st set of Vibration Measurements at NIF (NIF-00050996). These tests verify that the HVAC equipment in the OAB is performing within the vibration specification for CSP-5.

Testing of the HVAC systems seems thorough and complete. The test results are well documented and all major concerns have been addressed. The ATPs verify the systems meet the temperature, humidity and cleanliness requirements specified for CSP-5.



Sherrill Engineering also reviewed several commissioning and testing reports of Non-HVAC "Specialty" Systems for completeness and acceptability. These systems include:

Domestic cold water disinfecting

De-ionized water

Compressed air

Nitrogen gas

Vacuum cleaning

Wet pipe fire sprinkler

Telephone and data communications

Emergency voice / alarm & page

Fire alarm & smoke detection

Oxygen monitoring

Air ionization

Power feed harmonic filters

Programmable lighting controls

A summary review of these systems is included in the Sherrill Engineering Submittal.

Project Special Equipment

The Mechanical Parts Gross Cleaner is a simple high pressure spray system and has no formal ATP. The engineer that wrote the specifications for the design and performance of the system checked it out after it was installed and activated. That engineer indicates that the system meets all design and performance requirements.

LLNL engineers and technicians have written specific ATPs for the Small and Large Mechanical Precision Cleaners that directly test against the design specifications. Although not officially reviewed and approved, these ATPs appear to be thorough and adequate. Subsets of the ATPs, as specified in the documents, were performed at the vendor site. These test results are documented and currently located in the testing engineer's office in trailer 5983. The final acceptance tests for this equipment have started and are scheduled for completion by the end of August, 2000. Since this system was disassembled for transportation and reassembled at LLNL, the lifting fixtures used in these cleaners need to be retested at LLNL.

Load tests and Acceptance tests for the 2 OAB vertical lifts (serial number 63273-1 and 63273-2) were performed at the manufacture (Handling Specialty) and witnessed by an LLNL Mechanical Engineer on 10/9/98. These tests are documented in the Load Testing Procedure 63273-LT for Cargovator Type Lift, Model 1310-400 and Acceptance Test of Cargovators Type Lift, Model 1310-400, Specification 63273-AT.

This information is currently located in trailer 5983, in a set of binders containing MPR Documents for the OAB. This lift was disassembled at the manufacture and transported and installed at LLNL. There is no documentation of final test of this equipment after installation at LLNL. Load test has not been done at LLNL. Pinch points have been identified that need to be



covered before routine operations. ATPs and load tests need to be performed at LLNL before equipment is placed into use.

Load tests and Acceptance tests for the OAB airlock vertical lift (serial number 63910) was performed at the manufacture (Handling Specialty) on 10/23/98. These tests are documented in the Load Testing Procedure 63273-LT for Cargovator Type Lift, Model 0811-70 and Acceptance Test of Cargovators Type Lift, Model 0811-70., Specification 63910-AT. This information is currently located in trailer 5983, in a set of binders containing MPR Documents for the OAB. This lift was disassembled at the manufacture and transported and installed at LLNL. There is no documentation of final test of this equipment after installation at LLNL. Load test has not been done at LLNL. An ATP and load test needs to be performed at LLNL before this lift is placed into use. Identified pinch points need to be covered before routine operations.

Load tests and Acceptance tests for the OAB bridge crane were completed at LLNL on 2/9/99 using a temporary power source and the crane pendant control. The ATP was performed by the crane manufacture (HECO) representative and witnessed by an LLNL ME engineer. The load tests were performed and approved by LLNL. This crane needs to under go another ATP since being connected through its control panel to permanent building power.

Load tests and Acceptance tests for two of the OAB Jib Cranes (serial #15342441A and #15342441B) were completed at LLNL on 2/10/99 using a temporary power source. The ATP was performed by the crane manufacture (HECO) representative and witnessed by several LLNL representatives. The load tests were performed and approved by LLNL. These cranes need to under go another ATP since being connected to permanent building power.

The third Jib Crane, located in the mechanical parts gross cleaning area, was acceptance tested at the vendor on 5/4/99 and witnessed by several LLNL representatives. This crane, after being connected to permanent building power, was acceptance tested and load tested at LLNL on 6/15/00, but the load test was not properly witnessed or certified to LLNL requirements. This information is currently located in trailer 5983, in a set of binders containing MPR Documents for the OAB. The load test needs to be repeated to meet LLNL requirements before this crane is placed into use.

The OAB contains three Ergotech's (rotating assembly tables). These are commercially available units manufactured in Sweden. These units were tested at the factory. The factory load test (3300 lbs) of one unit was documented on video. These units are rated for 3000 lbs. The other two units were certified by the manufacture to have been tested and to meet all requirements. The first unit was tested by LLNL for cleanliness in building 432. These units have not been load tested or acceptance tested since being installed in the OAB. All of these units need to be acceptance tested and load tested in the OAB before they are placed into use.

The OAB LRU Transporter was acceptance tested and load tested at the manufacture (Alum-a-Lift Inc.) on 6/15/00. The dedicated 4x1 end-effector and lift were proof tested to 2500 lbs using a mock PEPC frame and lead weights. Limit switches and range of motion were included in the tests. Both the end-effector and lift are marked at 2000 lbs max capacity. The tests were witnessed by an LLNL engineer. The test information is currently located in trailer 5983, in a set of binders containing MPR Documents for the OAB.

Conclusion:



Conventional Facilities Equipment:

In general the acceptance testing for the conventional facilities equipment appears to be thorough and well documented. Many of the tests were performed during the installation and activation of the equipment. In several cases, independent testing agents were contracted to perform acceptance tests including, Thermoscope, Inc, for HVAC testing, adjusting, and balancing, and Micro-Test, Inc. for the clean room certification. Most of these test were witnessed by a Jacobs Q/A representative and/or a LLNL representative. In addition, many of the tests were either duplicated or reviewed by the commissioning contractor, Sherrill Engineering. These ATPs certify the OAB HVAC equipment meet temperature, humidity, and cleanliness requirements specified in CSP-15.

The OAB exhaust fans EF-2 and EF-3 are not interlocked to MAU-1 operations. If MAU-1 is turned off and the exhaust fans continue to run, the clean rooms will become negative relative to the outdoors and potentially become contaminated.

Recommended Corrective Action:

Review the effect on the clean rooms if MAU-1 is not operational and the exhaust fans continue to operate. Determine the correct response and implement.

Project Special Equipment:

The ATPs for the mechanical cleaners appear to be appropriate, thorough and complete with minor exceptions. The ATP for the Gross Cleaner was an informal test to verify the system performed as specified and expected. This is an appropriate ATP for this simple, high pressure sprayer. The tests were performed by the specifying engineer and the system met all requirements. The ATP's for the Large and Small Mechanical Precision Cleaners are a detailed set of tests performed specifically against the design requirements. These tests were performed together by the manufacture and LLNL representatives. These tests are well documented and certify that the cleaners perform as specified in their design documents.

In general the lifting equipment including the hoists, cranes, lifts and Ergotech's were acceptance tested at the manufacture and witnessed by a LLNL representative. Many of these tests are detailed and well documented and demonstrate that the systems perform as specified by their procurement and design documents.

The lifting fixtures for the large and small precision cleaners need to be certified by LLNL. Although these units were tested at the manufacture, they were disassembled, transported to LLNL and reassembled and therefore should be recertified as installed.

Recommended Corrective Action:

Complete load tests and certification per LLNL requirements (see Review Element # 16 "Material Handling").

Since much of lifting equipment was disassembled, transported, and reassembled at LLNL, then tested using temporary power (control systems not completely installed), or load testing was not performed on "as installed" equipment, several of the ATPs and load tests need to be repeated at LLNL. Specific tests that need to be repeated are noted in the Discussion area under Project Special Equipment. These lifts, cranes, and hoists should not be used until these tests are completed.

Recommended Corrective Action:



- 1) Two Vertical lifts (serial number 63273-1 and 63273-2)—ATPs and load tests need to be performed at LLNL and pinch points need to be covered before equipment is placed into use.
- 2) Airlock vertical lift (serial number 63910)—An ATP and load test need to be performed at LLNL and pinch points need to be covered before this lift is placed into use.
- 3) Bridge Crane - This crane needs to under go another ATP since being connected through its control panel to permanent building power.
- 4) Jib Cranes (serial #15342441A and #15342441B)—These cranes need to under go another ATP since being connected to permanent building power.
- 5) Jib Crane, located in the mechanical parts gross cleaning area —The load test needs to be repeated to meet LLNL requirements before this crane is placed into use.
- 6) Three Ergotech's—All of these units need to be acceptance tested and load tested in the OAB before they are placed into use



| | |
|---|-------------------------|
| Review Category: Plans and Procedures—Assembly, Installation and Operating Procedures | Review No.: 27 |
| | Review Date: 09/01/00 |
| Review Element: Operating and Assembly procedures prepared, reviewed and approved Prepared in accordance to NIF requirements Scope of activity accurately addressed | Reviewer: Don McLamb |
| | Page 1 of 3 |
| Criterion Met? Yes: No: X | |
| Criterion: Primarily applies to HVAC Systems, lifts, and cleanliness systems and processes. May be required for additional equipment installations (Manufacturers documentation is appropriate) | |



Approach: Documents and records review:

NIF Operations Training Plan, NIF-0038026, 17May 2000.

Assembly and Refurbishment Plan, Volume 1, 7/21/00.

Systems Operations Manual; HVAC Systems; DI Water;

Vendor Documentation in Systems Manuals; OAB-A7 Through OAB-A20.

Procedure 5.1, Content of O&M Procedures.

Qualification Card for "Operator OJT for the NIF OAB"

Qualification Card for Optics Processing, Facility Cleaning

Draft of Plant Engineering, Optics Assembly Building.

IWS for Installation of assembly equipment in the OAB

IWS for mechanical cleaning development

IWS 111599-03, for installation of Special equipment for OAB

"Volumes for MPR review":

Bridge Crane and Jib Crane

ERGOTECH optics insertion mechanism.

NOID (New Optics Insertion Device).

The Laboratory Facility Charge Funded Services Plan for the NIF OAB includes cranes, elevators, roll-up doors, mechanical equipment, facility electrical, lighting, industrial electronics (e.g. Fire system), High voltage (13.8 KV) and stand by power identified as qualified per NIF requirements.

OAB protocol training, Clean room maintenance, repair, & installation (Trained 8/30/00)

Laser Programs ISM Guide.

Personnel Interviews; Len Silva, George Riehl, Gary Edwards, Kim Doran, Chuck Ellerbee, Jim Foye.

OAB Walk-down on 7/27/00.



Discussion of Results:

Assembly, Installation and Operating procedures are available in the Library for:

- Auto door and swing door closers
- Sprinkler System
- Pressure switches and solenoids
- Vacuum cleaning
- De-ionized Water
- Compressed air dryer
- Nitrogen filter
- Humidifier
- Pace Air handling units, filters, controls, etc.
- CleanPak air handlers, cooling coils, drives, etc.
- Greenheck air conditioning equipment
- Direct digital controls system
- Harmonic trap filter
- Switch and MCC
- Fire alarm
- Programmable lighting.

Assembly, Installation and/or Operating procedures were not found for:

- Bridge crane
- Jib crane
- Transporter Lifts
- Mechanical cleaners

Conclusion:

Operating procedures are needed for the bridge crane, jib crane, and mechanical cleaners. All other operating procedures needed to continue build-up of the OAB are adequate.

Recommended Corrective Action:

Obtain or prepare operating procedures for the transporter lifts, bridge crane, jib crane and mechanical cleaners.



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|---|------------------------|
| Review Category: Procedure/Plan—Equipment Test Records/Calibration | Review No. 28 |
| | Review Date: 9/1/00 |
| Review Element: Calibration Plan and Procedures Prepared Calibration completed and Documented | Reviewer: Glenn Hermes |
| | Page 1 of 2 |
| Criterion Met? Yes: No: X | |
| Criterion: Per Laser Programs Calibration Plan (L-24532-1) equipment and systems considered by the Program to be “significantly important” are required to be reviewed and categorized through a graded approach methodology to determine the level of calibration plan needing to be applied. | |
| Approach: Documents and records review: Plant Engineering OAB Maintenance Plan, NIF Operations OAB HVAC Operating and Maintenance procedures, NIF Operations OAB DI Water System Operating and Maintenance procedures. Personnel interviews: Plant Engineering Commissioning representative, NIF Facility representative, and Laser Programs Assurances Office representative. Walk-downs, inspections, observations of activities: N/A | |
| Discussion of Results: The OAB equipment was initially setup and calibrated per the test procedures done by the individual equipment manufactures. Specifically, the HVAC system calibration points were set, tested, and verified by Yamas Controls Inc. and Sherrill Engineering during OAB commissioning. These settings and checks are documented in the submittals noted under Acceptance Testing Procedures of this MPR. This effort is well documented and appears to be thorough and complete. Much of this effort was witnessed by LLNL plant, Program or a Jacobs QA inspector. As part of the OAB HVAC operation and maintenance plans developed by the Program and Plant Engineering, routine performance checks and calibration verifications are called out as general good business practice. The specific equipment and frequency of calibration is not specifically addressed. | |



Conclusion:

Due to the critical nature of temperature stability, humidity control, and clean-room performance for the OAB and its impact on the Program, the level and frequency of equipment calibration for OAB should be above and beyond general good business practice. The OAB should be reviewed with respect to the Laser Programs Calibration Plan to determine the need, level and frequency of a specific calibration plan to be incorporated into the maintenance procedures.

Recommended Corrective Action:

Representatives from NIF Facility operations, LLNL Plant Engineering, and the AIRO group should develop a detailed calibration plan for the OAB using the Laser Programs Calibration Plan (L-24532-1) as guidance. The requirement and frequency for specific equipment calibration should be addressed as part of the OAB conventional facilities and program process equipment operations and maintenance plans.



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| Review Category: Plans and Procedures—Maintenance Plan and Procedures | Review No.: 29 |
| | Review Date: 09/01/00 |
| Review Elements: Plan prepared, reviewed and approved; Plan and procedures consistent with LLNL requirements. Procedures prepared, reviewed, and approved. Maintenance performed with IAW procedures. Training in Maintenance conducted and documented. Maintenance of equipment documented. | Reviewer: Don McLamb |
| | Page 1 of 3 |
| Criterion Met? Yes: No: X | |
| Criterion: Address at-risk equipment and operations, like HVAC, Cleanliness Systems, Lifts and Cranes. Potentially, use Plant Engineering maintenance Plans and Systems for the early phases. | |



Approach: The method(s) used to conduct the review of this element included the following:

I Documents and records review:

NIF Operations Training Plan, NIF-0038026, 17May 2000.

Assembly and Refurbishment Plan, Volume 1, 7/21/00.

Systems Operations Manual; HVAC Systems; DI Water;

Vendor Documentation in Systems Manuals; OAB-A7 Through OAB-A20.

Procedure 5.1, Content of O&M Procedures.

Qualification Card for "Operator OJT for the NIF OAB"

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Draft of Plant Engineering , Optics Assembly Building.

IWS for Installation of assembly equipment in the OAB

IWS for mechanical cleaning development

IWS 111599-03, for installation of Special equipment for OAB

"Volumes for MPR review":

Bridge crane and Jib crane

ERGOTECH optics insertion mechanism.

NOID (New Optics Insertion Device).

The Laboratory Facility Charge Funded Services Plan for the NIF OAB includes cranes, elevators, roll-up doors, mechanical equipment, facility electrical, lighting, industrial electronics (e.g. Fire system), High voltage (13.8 KV) and stand by power identified as qualified per NIF requirements.

OAB protocol training, Clean room maintenance, repair, & installation (Trained 8/30/00)

Laser Programs ISM Guide.

II Personnel Interviews; Len Silva, George Riehl, Gary Edwards, Kim Doran, Chuck Ellerbee, Jim Foye.

III OAB Walk-down on 7/27/00



Discussion of Results:

An OAB specific maintenance plan has not been prepared, reviewed, and approved.

Operation and Maintenance procedures exist for all equipment required for Phase one in the NIF Conventional Facilities Library except for the bridge crane, jib crane, and the mechanical cleaners. Expanded maintenance plans and procedures including PM schedules are under development. Plant Engineering has identified the lead responsible persons for their areas of responsibilities.

Reviewed and approved maintenance procedures were not available for all equipment.

Records of maintenance IAW procedures were not available.

Documentation of training in maintenance procedures was not available.

Maintenance procedures provided by the equipment vendors will provide a good source for developing a reliability-centered preventive and corrective maintenance program. Information is available in all areas except the bridge crane, jib crane, and the mechanical cleaners.

Conclusion:

Maintenance Plans and Procedures are considered adequate to continue development and installations in the OAB. A comprehensive maintenance plan and procedures must be developed that will include preventive, predictive and corrective maintenance elements before the OAB is committed to operational support.

Recommended Corrective Action:

Develop a comprehensive maintenance plan and required procedures for dealing with the high reliability and availability requirements of the OAB and the LTAB. The maintenance plan and procedures should have the following elements:

Complete Master Equipment List broken down by major systems to major components.

Complete set of preventive maintenance tasks and activity codes.

Corrective maintenance related to vendor maintenance recommendations.

Complete Predictive maintenance plans and activities.



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| Review Category: | Review No.: 42 |
| | Review Date: 8/28/00 |
| Review Element—Engineering Safety Notes | Reviewer: Bob Murray |
| | Page: 1 of 1 |
| Criterion Met? Yes: No: X | |
| Criterion: —Assemble list of OAB safety notes with status and contact | |
| Approach: —Discuss with Facility Engineer | |
| Discussion of Results: Two Safety notes have been identified as part at this review: Airlock lift alignment systems—not complete Spatial Filter Tower Transport cont.—complete # MESN00-043-OA | |
| Conclusion: —One safety note has been completed. —Approximately twenty-five safety notes have been identified for Phase II. —These notes will need to be prepared, reviewed, and approved during Phase II. Recommended Corrective Action: Complete Airlock Lift Safety Note. | |



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|---|--------------------------|
| Review Category | Review No.: 30 |
| Plans and Procedures—As-Built Drawings | Review Date: 9/6/00 |
| Review Elements: | Reviewer: Vaughn Draggoo |
| As-Built Drawings file | Page: 1 of 2 |
| Verification of As-Built | |
| Procedure to Control As-Built | |
| Criterion Met? Yes: No: X | |
| <p>Criterion:</p> <p>As-Built Drawings in file</p> <p>Verification of As-Built complete</p> <p>Procedure to Control As-Built in place</p> | |
| <p>Approach:</p> <p>Documents review:</p> <p>Completed As-Built drawings for CSP-5 submitted by A.C. Martin</p> <p>Draft NIF As-Built Control Procedure</p> <p>Personnel Interviewed:</p> <p>Mark Beyer NIF OAB Conventional Facilities Operations</p> <p>Paul Kemple Conventional Facilities Design Manager</p> <p>Suzanne Cabral NIF Configuration Manager</p> <p>Bernie Merritt--NIF Engineering Step Manager</p> <p>Dave Coats Plant Engineering Plant Engineering Design/Construction Division Leader</p> <p>Inspections/Observations:</p> <p>Walked down As-Built drawings for electrical panel schedules and grounding system in the electrical equipment room and mechanical equipment.</p> | |
| <p>Discussion of Results:</p> <p>The process to produce, verify and control As-Built drawings is not adequate. In this specific case the following deficiencies were noted:</p> <ul style="list-style-type: none"> • Verification that the As-Built are consistent with Field Mark-Ups was not accomplished. • For electrical panel schedules, the field equipment and field documentation is not consistent with As-Built drawings. • Method to control As-Built is not established. • As-Built have not been formally entered into a NIF or Plant Engineering records center. | |



Conclusion:

The process to produce, verify and control As-Built drawings needs to be addressed. The deficiencies can be addressed by acting on the Concerns listed below:

Recommended Corrective Action:

Verify that As-Built drawings are consistent with Red-Lined Field Drawings, identify and correct errors. Reconcile discrepancies between CSP-5 and CSP-17 drawings.

Recommended Corrective Action:

Perform and field verification of As-Built drawings, especially for safety related items like electrical panel schedules and conduit routing.

Recommended Corrective Action:

Prepare, approve and implement an As-Built Control Procedure with the concurrence of Plant Engineering and LLNL Engineering Directorate.



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| Review Category: | Review No.: 31 |
| Plans and Procedures--Conduct of Operations | Review Date: |
| Review Element: | Reviewer: Keith Gershon |
| Lock and Tag | Page: of . |
| Criterion Met? Yes: No: X | |
| Criterion NIF Lock and Tag procedure should conform to LLNL ESH Manual 26.13 and OSHA 29CFR 1910.147. | |
| Approach: Draft NIF Lock and Tag Procedure was reviewed. | |
| Discussion of Results: Discuss the results from the document/record review, the interviews, and walk-downs, inspections, etc. LLNL is presently updating the Lock and Tag procedures in the Health and Safety Manual. The NIF procedure will not be completed before the LLNL document is finalized. | |
| Conclusion: The LLNL Lock and Tag chapter is presently undergoing review by the Institutional Subcommittee and does not have a projected release date. It is estimated that it will be approved by 11-1-00. The NIF document will proceed through approvals after that time. Recommended Corrective Action: Continue using approved LLNL Institutional Lock and Tag Procedure. Pending revised LLNL Institutional procedure (expected 11/2000), revise a NIF specific procedure. | |



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| Review Category: Hazards Analysis Report, Environmental Documentation and Permits | Review No.: 39 & 43 |
| | Review Date: 9/8/00 |
| Review Element: PHA Prepared and Approved Air Permit and procedures to maintain permit. | Reviewers: Gary Edwards /Vaughn Draggoo |
| | Page: 1 of 2 |
| Criterion Met? Yes: No: X | |
| Criterion: Has the safety basis been documented, and is it current and accurate? Does the permit documentation meet the requirements of the Bay Area Air Quality Management District (BAAQMD)? | |
| Approach: Documents and records reviewed. "Hazards Analysis Report for the NIF Optics Assembly Building (OAB) and the Laser and Target Area Building B581 (LTAB)/OAB Corridor." NIF-0051996, July 2000. Permit # 2127, associated logs and monthly summaries. Walk-down of the source of the permit to include the source, the procedure, and the areas where the process is implemented | |
| Discussion of Results: The OAB HAR was approved in July 2000. It examines facility hazards and controls during the anticipated operations. Based on the materials to be used and expected operations, it documents the facility hazard classification as "General Industry." During the review, it was identified that the use of calcium thiosulphate to treat deionized water had not been considered in the safety basis. This should be evaluated and the safety basis documentation updated accordingly. The documentation of the permit meets all the requirements of the Bay Area Air Quality Management District (BAAQMD). A procedure on how to document and report usage is also in place. The log book and monthly summaries show usage well below the solvent usage limits at this time. | |
| Conclusion: An approved safety basis exists, that identifies facility hazards and controls, and documents the facility hazard classification as "General Industry". The use of calcium thiosulphate to treat deionized water had not been considered in the safety basis. This should be evaluated and the safety basis documentation updated accordingly. The OAB Air permit is in place and has been in use since December 1999. All the criterion of the BAAQMD has been met. The OAB permit has recently been inspected by the District and passed with no issues. Recommended Corrective Action: Review the use of calcium thiosulphate at the OAB, and update the safety basis documentation accordingly. | |



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| Review Category: | Review No.: 50 |
| Plans—Integration Work Sheet | Review Date: 9/18/00 |
| Review Element: | Reviewer: Vaughn Draggoo |
| Integration Work Sheet prepared and approved | Page: of . |
| Criterion Met? Yes: <input checked="" type="checkbox"/> No: <input type="checkbox"/> | |
| Criterion: IWS should be prepared reviewed and approved consistent with NIF Project Control Procedure 5.12 Construction Site Work Authorization | |
| Approach: Documents reviewed: IWS # 08220001, Installation of assembly Equipment in OAB. IWS # 0907002, OAB facility and Facilities Support Equipment. Personnel Interviewed: Linda Fischer Inspections/Observations: LTRAIN data base | |
| Discussion of Results: IWS for OAB Equipment installation has been prepared and approved. Identification of personnel qualified for the work is not specific. Only the RI and ?? have been identified. Check of LTRAIN records show certain individuals are delinquent on Lock and Tag Training. IWS for OAB Conventional Facilities Operations is missing or has not been prepared | |
| Conclusion: Recommended Corrective Action: As the IWS for OAB Installation lacks specificity, there is a concern that training requirements for near term participants have not been verified nor met. | |



APPENDIX D

Integration Work Sheets for OAB Operations

Integration Work Sheet No: 09070002 rev. 2

Date: 10-5-00

Responsible AD: George Miller

Work Acct No: _____

| | | | | | | | | | |
|--|--|---|---|------------|-----------------------|--------------|------------------------|-----------------|-----------------------|
| 1. Responsible Individual: Leonard Silva | | 2. Ext.: 3-4233 | 3. L-Code: L-571 | | | | | | |
| 4. Authorizing Individual: Vaughn Draggoo | 5. Facility Point of Contact: Vaughn Draggoo | | 6. ES&H Team Leader: Mike Trent | | | | | | |
| 7. Authorizing Organization: BIS Commissioning & Operations | | 8. Intended Start Date: 10-1-00 | 9. Est. Completion Date: Ongoing | | | | | | |
| 10. <input type="checkbox"/> Management chain for proposed activity attached (organizational chart) <input checked="" type="checkbox"/> Management chain for proposed activity as follows: Ed Moses Project Manager, Valerie Roberts BIS Associate Project Manager, Vaughn Draggoo BIS Commissioning & Operations Manager, Leonard Silva BIS Conventional Facilities Manager | | | | | | | | | |
| 11. Location of proposed activity (facility/ area, room(s), offsite location): Optical Assembly Bld. (OAB) B681. Facility and Facility Support Equipment. All upstairs mechanical loft areas; Mechanical Room Electrical Utility Room, and Communications Room. | | | | | | | | | |
| 12. Emergency notification: Name: Leonard Silva Work Phone: 925-423-4233 Home Phone: 925-456-9135 | | 13. Alternate Emergency notification: Name: Mark Beyer Work Phone: 423-1483 Home Phone: 209-983-0283 | | | | | | | |
| 14. Activity/Operation type: <table border="0"> <tr> <td>X Attended</td> <td>% of time: <u>2</u> %</td> </tr> <tr> <td>X Unattended</td> <td>% of time: <u>96</u> %</td> </tr> <tr> <td>X Working Alone</td> <td>% of time: <u>2</u> %</td> </tr> </table> | | | | X Attended | % of time: <u>2</u> % | X Unattended | % of time: <u>96</u> % | X Working Alone | % of time: <u>2</u> % |
| X Attended | % of time: <u>2</u> % | | | | | | | | |
| X Unattended | % of time: <u>96</u> % | | | | | | | | |
| X Working Alone | % of time: <u>2</u> % | | | | | | | | |
| 15. Name of proposed activity/operation/project: OAB Facility and facility support equipment consisting of HVAC, Deionized water, and Vacuum systems. | | | | | | | | | |
| 16. Description of proposed work activity/operation/project: Standard industrial operation and maintenance of 38 Air handlers, Deionized water, and Vacuum systems. | | | | | | | | | |
| 17. Names of qualified personnel and/or subcontractors assigned tot his proposed activity: (Identify the payroll organization for each individual if different from yours) OAB Operations: (9773) Leonard Silva, (9709) Mark Beyer OAB Maintenance: George Riehl, Chuck Frost, Marty Johnson, and other PE personnel NIF Contract Personnel. Training for "other", not specified personnel is verified through job specific task planning. | | | | | | | | | |

April 28, 2000

18. Associated Hazards – Environment, Safety & Health

☐ BIOLOGICAL

- ☐ Infectious materials (pathogens, human tissue & fluids)
- ☐ Other biohazards (protein toxins, recombinant DNA, exposure to sewage)
- ☐ Sharps/Needles
- ☐ Human use experiments
- ☐ Animals
- ☐ Food for human consumption

☐ CHEMICAL

- ☐ Flammable, volatile or fuming material >5 gal.
- ☐ Toxic materials (acutely toxic, irritants/corrosives, systemic toxicants, toxic gases)
- ☐ Reactive materials (air/water sensitive pyrophoric thermally, shock or friction sensitive, perchlorates)
- ☐ Pesticides
- ☐ Chemicals of "Special Concern" (beryllium, carcinogens, mutagens, fluorine, inter-halogen compounds, lead, asbestos, reproductive hazards, other)
- ☐ Hazardous chemical, Not Otherwise Specified

X CONSTRUCTION/MAINTENANCE/ MECHANICAL EQUIPMENT/WORKING SURFACES

- ☐ Construction/demolition (excavations, shoring, underground utilities, asbestos removal, welding, work at heights)
- ☐ Safety system maintenance (deactivated alarms, interlock bypass)
- ☐ Cranes/hoists (critical lifts, high work on cranes)
- ☐ Powered industrial trucks (critical lifts)
- ☐ Machine tools/powder-actuated tools
- X Moving large or heavy items
- ☐ Contaminated equipment (mercury, PCB, radioactive material, lead)
- ☐ Stressed mechanical systems
- ☐ Unusual equipment requiring special approvals (scuba diving, etc.)
- ☐ Walking/working surfaces/heights/falling objects

X ELECTRICAL

- ☐ Batteries (with short circuit >10 amps or >50 volts)
- ☐ Capacitors (>10 joules of electrical energy)
- X Electrical power source (>140 volts or >30 amps or containing >10 joules of electrical energy, or systems with 2 or more sources of electrical power.)
- ☐ Energized electrical equipment (work on exposed, energized electrical equipment >50 volts, 20 amps, or an operation using portable equipment at other than ground potential)
- ☐ Static electricity
- ☐ Hi-Potential testing (>500 volts)

☐ EXPLOSIVES/FIREARMS

- ☐ High explosives, propellant, pyrotechnic or other similar energetic material
- ☐ Mock explosive
- ☐ Unstable material
- ☐ Firearms

X PRESSURE/NOISE/HAZARDOUS ATMOSPHERES

- X Pressure vessels/systems (low pressure system <1500 psig-liquid or <150 psig gas, pressure system >1500 psig-liquid or >150 psig gas, ≥ 100 kJ stored energy, vacuum systems, cryogenics)
- X Noise (>85dB)
- X Confined spaces (high-hazard, low-hazard)
- ☐ Hazardous atmospheres (asphyxiants, hydrogen gas, oxygen deficiency, work requiring a respirator)

X ☐ WORKER CAPABILITY

- ☐ Lifting manually >30 pounds
- ☐ Work involving repetitive motion
- ☐ Computer use >4 hrs/day
- X ☐ Hand Tools
- X ☐ Work with mechanical equipment
- X ☐ Work alone
- X ☐ Work after hours
- ☐ Work in remote locations
- ☐ Work involving individuals <18 years of age
- ☐ Work requiring specific unusual physical capabilities

18. Associated Hazards- Environment, Safety & Health (cont.)

☐ **IONIZING/NON-IONIZING RADIATION**

- ☐ Non-fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Radiation-generating devices (RGD)
- ☐ Non-ionizing radiation-lasers/optical (class 1-3A, 3B, 4, UV, visible light, infrared)
- ☐ Magnetic fields <3kHz
- ☐ Radio frequency/microwaves sources >3kHz

☐ **TRANSPORTATION**

- ☐ Hazardous materials transportation
- ☐ Non-hazardous materials transportation (>routine operations)
- ☐ Use of vehicles (aircrafts, auto/truck/ATV, boat)

☐ **WEATHER/TEMPERATURE**

- ☐ Weather exposure or temperature extremes (harsh weather, lightening, temperature extremes)

☐ **EMERGENCIES/EARTHQUAKES/FIRE**

- ☐ Emergencies (unique emergency response situations)
- ☐ Earthquakes (unique seismic safety issues)
- ☐ Fire (unique fire safety issues)

☐ **AIR**

- ☐ Discharge to air (air contaminates)

☐ **DISCHARGE TO WATER**

- ☐ Sanitary sewer/waste water (>routine use requirements)
- ☐ Storm water (>normal impacts)

☐ **ECOLOGICAL AND CULTURAL RESOURCES**

- ☐ Disturbance to existing structure or area (soils, drainage channel, arroyo, East Gate or Corral Hollow flood plain area, natural habitats, wetlands, undisturbed area)
- ☐ Disturbance to cultural resources

☐ **REMEDICATION AND MONITORING**

- ☐ Soil (possible impacts)
- ☐ Groundwater (possible impacts)
- ☐ Well drilling or other below ground activities
- ☐ Vegetation (possible impacts)

☐ **STORAGE TANKS**

- ☐ Retention tank
- ☐ Underground storage tanks

☐ **WASTE**

- ☐ Hazardous waste
- ☐ Radioactive waste (mixed waste, waste with no disposal option)
- ☐ Medical waste
- ☐ PCB waste
- ☐ Solid wastes (>routine quantities)

☐ **OTHER HAZARDS NOT LISTED**

- ☐ List below:

| |
|---|
| <p>19. Specific Hazards checked above: (chemicals, materials, isotopes, equipment, trenching, etc.):</p> <p>None</p> |
| <p>20. Required ES&H controls: (shielding, interlocks, barriers, gloves, emergency response, respirators, etc.) (See also 27)</p> <p>Follow requirements in Construction Safety Program (CSP) for NIF Prepare Job Hazards Analysis (JHA) for Area Construction Manager review Prepare Safe Plan of Action (SPA) daily for Area Construction Manager review</p> |
| <p>21. Required medical certification/surveillance: (laser eye exam, hearing conservation, respirator, etc.)</p> <p>None</p> |
| <p>22. Required or recommended ES&H training:</p> <p>Lock and Tag out</p> |
| <p>23. ES&H Professionals who provided assistance/guidance:</p> <p>Peter Huddleston</p> |
| <p>24. As the Responsible Individual, I believe the proposed activity/change to an existing activity:</p> <p><input checked="" type="checkbox"/> is a common laboratory activity or within the approved safety envelope and does not require any additional ES&H review or procedure.</p> <p><input type="checkbox"/> is adequately covered by our existing controls and documentation delineated below, which will be required reading for all individuals participating in this activity:</p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> may require additional ES&H review and documentation</p> <p><input type="checkbox"/> potentially increases or changes the hazard, requires or modifies a permit, increases hazardous waste, or modifies the potential environmental impact.</p> <p><input type="checkbox"/> involves special and unusual activities or equipment not completely covered by our existing ES&H review or documentation. See attachments (list).</p> |

25. As the RESPONSIBLE INDIVIDUAL, I have reviewed the hazards and agree to implement the controls identified in the IWS

Mark Beyer

Responsible Individual Signature

10-5-00

Date

26. AUTHORIZING INDIVIDUAL'S work authorization level assesment:

Work Authorization Level (circle): X 3 4 5 6

Additional ES&H documentation needed:

☐ None ☐ Hazard Assessment ☐ SOP ☐ Level C OSP ☐ Level B OSP (offsite)

☐ Level B OSP ☐ Level A OSP ☐ SAR/TSR/SAD/OSR/USQ/USI X ☐ Other (specify JHA/SPA

27. Additional requirements that need to be met before work can commence:

Coordinate access to NIF Site with Area Construction Manager.

JHA's, SPA's, Construction Safety Plan and Access Control (NIF Access Video, OAB Protocol "6" etc.)

Requirements are dependent upon work activities being performed. Plant Engineering accepts responsibility to provide IWS's and job specific training for tasks to be completed which P.E. manages and executes.

28. Record of Aurtherization for Work to Begin: IWS No. _____

☒ The proposed work falls within the safety envelope of the facility/area and may commence once authorized

Vaughn Dyson

Facility Point of Contact Concurrence

10/5/00

Date

ES&H Team Leader Concurrence

Date

(see previous IWS Rev 1

☒ The controls have been confirmed to be in place and this proposed activity is authorized to proceed.

Vaughn Dyson

Authorizing Individual Approval

10/5/00

Date

Send copies of this IWS to: the Responsible Individual, Facility Point of Contact, ES&H Team Leader, and payroll supervisors of the employees performing this work activity.

Form Date 3/3/00

April 28, 2000

ES&H Team 2 ES&H Integration Worksheet Hazard Assessment

Today's Date: 9/19/00

| | | | |
|-------------------------|-----------------------------------|------------|--------|
| Proposed Operation: | OAB facility and facility Support | | |
| Responsible Individual: | Leonard Silva | Phone No.: | 3-4233 |
| Location of Activity: | OAB, B681 | | |
| Due Date: | 9/14/00 | | |
| IWS Number | 09070002 | | |

Comments:

Entry into the confined spaces such as the DI water tank requires a confined space entry permit.

This ES&H Integration Worksheet has been reviewed by the appropriate ES&H Disciplines assigned to Hazards Control ES&H Team 2. Contact ES&H Team 2 at 2-6126 if an OSP or ISE is required.

☐ OSP Required

☒ No OSP Required


ES&H Team 2 Division Leader

9/20/00
Date

ES&H Team 2 ES&H Integration Worksheet Hazard Assessment Discipline Review

Today's Date: 9/7/00

| | | | |
|-------------------------|---|------------|--------|
| Proposed Operation: | OAB Facility and facility support equipment consisting of HVAC, Deionized water, and Vacuum systems | | |
| Responsible Individual: | Leonard Silva | Phone No.: | 3-4233 |
| Location of Activity: | Optical Assembly Building (OAB) B681. Facility and Facility Support Equipment | | |
| Due Date: | 9/14/00 | | |
| IWS Number | 09070002 | | |

Please review the attached ES&H Integration Worksheet for proposed operations in and determine if an ISE or an OSP is required. Include reasons for requiring an ISE or OSP in the comments section below.

If this operation or room is already covered under an existing OSP or FSP, please list the title and number of that OSP.

Please have your comments in to me by the date shown above.

| | |
|---------------------------------------|---|
| <input type="checkbox"/> OSP Required | <input checked="" type="checkbox"/> No OSP Required |
|---------------------------------------|---|

Comments:

No fire protection concerns.

| | Discipline | Name | Date | Initial |
|---|--------------------|---------------|---------|---------|
| X | Industrial Hygiene | Al Buerer | | |
| X | Fire Protection | Jesse Lum | 9/17/00 | jd |
| X | Industrial Safety | Tom Coward | | |
| X | Environmental | Dennis Peifer | | |
| | Health Physics | | | |

If you have any questions, please let me know. Thad 4-5148 ✓

ES&H Team 2 ES&H Integration Worksheet Hazard Assessment Discipline Review

Today's Date: 9/7/00

| | | | |
|-------------------------|---|------------|--------|
| Proposed Operation: | OAB Facility and facility support equipment consisting of HVAC, Deionized water, and Vacuum systems | | |
| Responsible Individual: | Leonard Silva | Phone No.: | 3-4233 |
| Location of Activity: | Optical Assembly Building (OAB) B681. Facility and Facility Support Equipment | | |
| Due Date: | 9/14/00 | | |
| IWS Number | 09070002 | | |

Please review the attached ES&H Integration Worksheet for proposed operations in and determine if an ISE or an OSP is required. Include reasons for requiring an ISE or OSP in the comments section below.

If this operation or room is already covered under an existing OSP or FSP, please list the title and number of that OSP.

Please have your comments in to me by the date shown above.

☐ OSP Required

☐ No OSP Required

Comments:

ENTRY INTO CONFINED SPACES SUCH AS
THE DI WATER TANK REQUIRES A CONFINED
SPACE ENTRY PERMIT

| | Discipline | Name | Date | Initial |
|---|--------------------|---------------|--------|---------|
| X | Industrial Hygiene | Al Buerer | 9-7-00 | AB |
| X | Fire Protection | Jesse Lum | | |
| X | Industrial Safety | Tom Coward | | |
| X | Environmental | Dennis Peifer | | |
| | Health Physics | | | |

If you have any questions, please let me know. Thad 4-5148 ✓

ES&H Team 2 ES&H Integration Worksheet Hazard Assessment Discipline Review

Today's Date: 9/7/00

| | | | |
|-------------------------|---|------------|--------|
| Proposed Operation: | OAB Facility and facility support equipment consisting of HVAC, Deionized water, and Vacuum systems | | |
| Responsible Individual: | Leonard Silva | Phone No.: | 3-4233 |
| Location of Activity: | Optical Assembly Building (OAB) B681. Facility and Facility Support Equipment | | |
| Due Date: | 9/14/00 | | |
| IWS Number | 09070002 | | |

Please review the attached ES&H Integration Worksheet for proposed operations in and determine if an ISE or an OSP is required. Include reasons for requiring an ISE or OSP in the comments section below.

If this operation or room is already covered under an existing OSP or FSP, please list the title and number of that OSP.

Please have your comments in to me by the date shown above.

| | |
|---------------------------------------|---|
| <input type="checkbox"/> OSP Required | <input checked="" type="checkbox"/> No OSP Required |
|---------------------------------------|---|

Comments: An OSP is not required from an environmental standpoint. No additional NEPA documentation is required.

| | Discipline | Name | Date | Initial |
|---|--------------------|---------------|---------|---------|
| X | Industrial Hygiene | Al Buerer | | |
| X | Fire Protection | Jesse Lum | | |
| X | Industrial Safety | Tom Coward | | |
| X | Environmental | Dennis Peifer | 9-13-00 | DP |
| | Health Physics | | | |

If you have any questions, please let me know. Thad 4-5148 ✓

Integration Work Sheet No: 09070001

Date: 9/1/00

Responsible AD: George Miller

Work Acct No: _____

| | | | |
|--|--|--|--|
| 1. Responsible Individual: Gary Edwards | | 2. Ext.: 3-1921 | 3. L-Code: L-571 |
| 4. Authorizing Individual: Gina Bonanno | 5. Facility Point of Contact: Vaughn Draggoo | | 6. E&H Team Leader: Mike Trent |
| 7. Authorizing Organization: Assembly and Refurbishment Organization | | 8. Intended Start Date: 9/1/2000 | 9. Est. Completion Date: 4/1/2003 |
| 10. <input type="checkbox"/> Management chain for proposed activity attached (organizational chart) <input checked="" type="checkbox"/> Management chain for proposed activity as follows: George Miller, Ed Moses, Jeff Atherton, Gina Bonanno, Gary Edwards | | | |
| 11. Location of proposed activity (facility/ area, room(s), offsite location): Bldg. 681, Rms. 1022, 1018, 1015 | | | |
| 12. Emergency notification: Name: Gary Edwards Work Phone: 3-1921 Home Phone: | | 13. Alternate Emergency notification: Name: Don Gemmell Work Phone: 3-6143 Home Phone: | |
| 14. Activity/Operation type: <input checked="" type="checkbox"/> Attended % of time: 100 % <input type="checkbox"/> Unattended % of time: _____ % <input type="checkbox"/> Working Alone % of time: _____ % | | | |
| 15. Name of proposed activity/operation/project: Mechanical Cleaning Development, Mechanical Parts Cleaning for Beampath Infra-Structure (BIS) parts and various customers for NIF. | | | |
| 16. Description of proposed work activity/operation/project: Process development of the mechanical cleaning systems: Large Parts Gross cleaner (LPGC), Large Mechanical Parts Precision Cleaner (LMPPC), and the Small Mechanical Parts Gross and Precision Cleaner (SMPGPC). This will include decisions on the following parameters: temperature, % of cleaning solution, time in each tank and the sequence of the operation. Once process development is complete the cleaners will begin processing NIF mechanical parts to include the following areas: Loading dock-loading and unloading parts, packaging and unpacking of parts, and pre-cleaning (wipe cleaning). Gross Mechanical Cleaning Area-Gross cleaning of mechanical parts using the Large Parts Gross Cleaner, utilization of jib crane and other material handling devices, packaging and unpacking, and wipe cleaning. Precision Mechanical cleaning Area- Precision cleaning of mechanical parts in the LMPPC and the SMPGPC, utilization of material handling devices, and packaging and unpacking of parts. | | | |

April 28, 2000

17. Names of qualified personnel and/or subcontractors assigned tot his proposed activity:

(Identify the payroll organization for each individual if different from yours)

Henry Wong, NIF-JCWS

Don Gemmell, NIF-JCI

Ray Aboud, NIF, JCI

Rick Rhodes, NIF-JCI

Max Bergonia, NIF-JCI

18. Associated Hazards – Environment, Safety & Health

☐ BIOLOGICAL

- ☐ Infectious materials (pathogens, human tissue & fluids)
- ☐ Other biohazards (protein toxins, recombinant DNA, exposure to sewage)
- ☐ Sharps/Needles
- ☐ Human use experiments
- ☐ Animals
- ☐ Food for human consumption

☐ CHEMICAL

- ☐ Flammable, volatile or fuming material >5 gal.
- ☐ Toxic materials (acutely toxic, irritants/corrosives, systemic toxicants, toxic gases)
- ☐ Reactive materials (air/water sensitive pyrophoric thermally, shock or friction sensitive, perchlorates)
- ☐ Pesticides
- ☐ Chemicals of "Special Concern" (beryllium, carcinogens, mutagens, fluorine, inter-halogen compounds, lead, asbestos, reproductive hazards, other)
- ☐ Hazardous chemical, Not Otherwise Specified

☒ CONSTRUCTION/MAINTENANCE/ MECHANICAL EQUIPMENT/WORKING SURFACES

- ☐ Construction/demolition (excavations, shoring, underground utilities, asbestos removal, welding, work at heights)
- ☐ Safety system maintenance (deactivated alarms, interlock bypass)
- ☒ Cranes/hoists (critical lifts, high work on cranes)
- ☐ Powered industrial trucks (critical lifts)
- ☐ Machine tools/powder-actuated tools
- ☐ Moving large or heavy items
- ☐ Contaminated equipment (mercury, PCB, radioactive material, lead)
- ☐ Stressed mechanical systems
- ☐ Unusual equipment requiring special approvals (scuba diving, etc.)
- ☐ Walking/working surfaces/heights/falling objects

☐ ELECTRICAL

- ☐ Batteries (with short circuit >10 amps or >50 volts)
- ☐ Capacitors (>10 joules of electrical energy)
- ☐ Electrical power source (>140 volts or >30 amps or containing >10 joules of electrical energy, or systems with 3 or more sources of electrical power.)
- ☐ Energized electrical equipment (work on exposed, energized electrical equipment >50 volts, 20 amps, or an operation using portable equipment at other than ground potential)
- ☐ Static electricity
- ☐ Hi-Potential testing (>500 volts)

☐ EXPLOSIVES/FIREARMS

- ☐ High explosives, propellant, pyrotechnic or other similar energetic material
- ☐ Mock explosive
- ☐ Unstable material
- ☐ Firearms

☒ PRESSURE/NOISE/HAZARDOUS ATMOSPHERES

- ☒ Pressure vessels/systems (low pressure system <1500 psig-liquid or <150 psig gas, pressure system >1500 psig-liquid or >150 psig gas, \geq 100kj stored energy, vacuum systems, cryogenics)
- ☒ Noise (>85dB)
- ☐ Confined spaces (high-hazard, low-hazard)
- ☐ Hazardous atmospheres (asphyxiants, hydrogen gas, oxygen deficiency, work requiring a respirator)

☐ WORKER CAPABILITY

- ☐ Lifting manually >30 pounds
- ☐ Work involving repetitive motion
- ☐ Computer use >4 hrs/day
- ☐ Hand Tools
- ☐ Work with mechanical equipment
- ☐ Work alone
- ☐ Work after hours
- ☐ Work in remote locations
- ☐ Work involving individuals <18 years of age
- ☐ Work requiring specific unusual physical capabilities

18. Associated Hazards- Environment, Safety & Health (cont.)

☐ IONIZING/NON-IONIZING RADIATION

- ☐ Non-fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Radiation-generating devices (RGD)
- ☐ Non-ionizing radiation-lasers/optical (class 1-3A, 3B, 4, UV, visible light, infrared)
- ☐ Magnetic fields >3kHz
- ☐ Radio frequency/microwaves sources >3kHz

☐ TRANSPORTATION

- ☐ Hazardous materials transportation
- ☐ Non-hazardous materials transportation (>routine operations)
- ☐ Use of vehicles (aircrafts, auto/truck/ATV, boat)

☐ WEATHER/TEMPERATURE

- ☐ Weather exposure or temperature extremes (harsh weather, lightening, temperature extremes)

☐ EMERGENCIES/EARTHQUAKES/FIRE

- ☐ Emergencies (unique emergency response situations)
- ☐ Earthquakes (unique seismic safety issues)
- ☐ Fire (unique fire safety issues)

X☐ AIR

- X☐ Discharge to air (air contaminates)

☐ DISCHARGE TO WATER

- ☐ Sanitary sewer/waste water (>routine use requirements)
- ☐ Storm water (>normal impacts)

☐ ECOLOGICAL AND CULTURAL RESOURCES

- ☐ Disturbance to existing structure or area (soils, drainage channel, arroyo, East Gate or Corral Hollow flood plain area, natural habitats, wetlands, undisturbed area)
- ☐ Disturbance to cultural resources

☐ REMEDIATION AND MONITORING

- ☐ Soil (possible impacts)
- ☐ Groundwater (possible impacts)
- ☐ Well drilling or other below ground activities
- ☐ Vegetation (possible impacts)

☐ STORAGE TANKS

- ☐ Retention tank
- ☐ Underground storage tanks

☐ WASTE

- ☐ Hazardous waste
- ☐ Radioactive waste (mixed waste, waste with no disposal option)
- ☐ Medical waste
- ☐ PCB waste
- ☐ Solid wastes (>routine quantities)

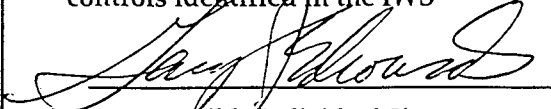
☐ OTHER HAZARDS NOT LISTED

- ☐ List below: _____
- _____
- _____
- _____

| |
|---|
| <p>19. Specific Hazards checked above: (chemicals, materials, isotopes, equipment, trenching, etc.): During the equipment installation in room 1001, bump caps will be required during overhead operations in the associated rooms. SPA's will be the administrative control for when bump caps will be required and in the location they will be required. Bump caps will always be required when working under the raised floor or when working in the basement area. Facehields, cleanroom compatible rain suit, and gloves required for Gross cleaner</p> |
| <p>20. Required ES&H controls: (shielding, interlocks, barriers, gloves, emergency response, respirators, etc.) (See also 27) Follow requirements in the Construction Safety Program (CSP) for NIF Prepare Job Hazards Analysis (JHA) for Construction Area Manager review Prepare Safe Plan of Action (SPA) for Construction Area Manager review</p> |
| <p>21. Required medical certification/surveillance: (laser eye exam, hearing conservation, respirator, etc.) None</p> |
| <p>22. Required or recommended ES&H training: - NIF Site Safety Video OAB Cleanroom Level 6 protocol Training</p> |
| <p>23. ES&H Professionals who provided assistance/guidance: Dan Benjamin, Peter Huddleston</p> |
| <p>24. As the Responsible Individual, I believe the proposed activity/change to an existing activity:</p> <p><input type="checkbox"/> is a common laboratory activity or within the approved safety envelope and does not require any additional ES&H review or procedure.</p> <p>X <input checked="" type="checkbox"/> is adequately covered by our existing controls and documentation delineated below, which will be required reading for all individuals participating in this activity:</p> <p><u>Vendor documentation and specific cleaner process maps</u></p> <p><u>Applicable Job Hazards Analysis (JHAs)</u></p> <p><input type="checkbox"/> may require additional ES&H review and documentation</p> <p><input type="checkbox"/> potentially increases or changes the hazard, requires or modifies a permit, increases hazardous waste, or modifies the potential environmental impact.</p> <p><input type="checkbox"/> involves special and unusual activities or equipment not completely covered by our existing ES&H review or documentation. See attachments (list).</p> |

April 28, 2000

25. As the RESPONSIBLE INDIVIDUAL, I have reviewed the hazards and agree to implement the controls identified in the IWS


Responsible Individual Signature

9/20/00
Date

26. AUTHORIZING INDIVIDUAL'S work authorization level assesment:

Work Authorization Level (circle): X 3 4 5 6

Additional ES&H documentation needed:

☐ None ☐ Hazard Assessment ☐ SOP ☐ Level C OSP ☐ Level B OSP (offsite)

☐ Level B OSP ☐ Level A OSP ☐ SAR/TSR/SAD/OSR/USQ/USI X ☐ Other (specify JHA/SPA

27. Additional requirements that need to be met before work can commence:

Coordinate access to NIF Site with Area Construction Manager.

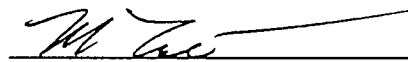
*This area has been turned over to Assembly and Refurbishment.
Area manager for construction need not be part of coordination.
Site Access rules remain in effect.*

28. Record of Aurthorization for Work to Begin: IWS No. 09070001

☒ The proposed work falls within the safety envelope of the facility/area and may commence once authorized

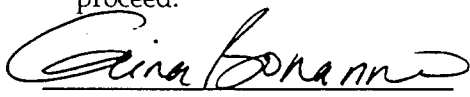

Facility Point of Contact Concurrence

9/20/00
Date


ES&H Team Leader Concurrence

9/20/00
Date

☐ The controls have been confirmed to be in place and this proposed activity is authorized to proceed.


Authorizing Individual Approval

9/28/00
Date

Send copies of this IWS to: the Responsible Individual, Facility Point of Contact, ES&H Team Leader, and payroll supervisors of the employees performing this work activity.

Form Date 3/3/00

April 28, 2000

Integration Work Sheet No: 08220001

Date: _____

Responsible AD: MillerWork Acct No: 7470-55

| | | | |
|--|---|---|---|
| 1. Responsible Individual: Pat Hurst | | 2. Ext.: 20246 | 3. L-Code: 571 |
| 4. Authorizing Individual: Gina Bonanno | 5. Facility Point of Contact: Vaughn. Draggoo | | 6. ES&H Team Leader: Mike Trent |
| 7. Authorizing Organization: Assembly, Refurbishment and Operations | | 8. Intended Start Date: 8/22/00 | 9. Est. Completion Date: 11/01/01 |
| 10. <input type="checkbox"/> Management chain for proposed activity attached (organizational chart) <input checked="" type="checkbox"/> Management chain for proposed activity as follows: Hurst, Bonanno, Atherton, Moses | | | |
| 11. Location of proposed activity (facility/ area, room(s), offsite location): Optics Assembly Building B681 | | | |
| 12. Emergency notification: Name: Pat Hurst Work Phone: 20246 Home Phone: 706-2337 | | 13. Alternate Emergency notification: Name: JB McLeod Work Phone: 43375 Home Phone: 875-0604 | |
| 14. Activity/Operation type: <input checked="" type="checkbox"/> Attended % of time: <u>100</u> % <input type="checkbox"/> Unattended % of time: <u>0</u> % <input type="checkbox"/> Working Alone % of time: <u>0</u> % | | | |
| 15. Name of proposed activity/operation/project: Installation of assembly equipment in OAB on the OAB main floor. This does not apply to the HVAC loft or utility rooms. | | | |
| 16. Description of proposed work activity/operation/project: Wipe down all equipment that enters the OAB with 10% Isopropyl Alcohol wipes. (MSDS #324). Riggers and technicians move equipment into OAB, place in proper position and fasten to floor structure. Electrical terminations of equipment. Drilling of equipment as needed for final fit. Acceptance tests completed. | | | |
| 17. Names of qualified personnel and/or subcontractors assigned to this proposed activity: Lasers Riggers, Plant Engineering Electricians, NIF technicians | | | |

April 28, 2000

18. Associated Hazards – Environment, Safety & Health

☐ BIOLOGICAL

- ☐ Infectious materials (pathogens, human tissue & fluids)
- ☐ Other biohazards (protein toxins, recombinant DNA, exposure to sewage)
- ☐ Sharps/Needles
- ☐ Human use experiments
- ☐ Animals
- ☐ Food for human consumption

☐ CHEMICAL

- ☐ Flammable, volatile or fuming material >5 gal.
- ☐ Toxic materials (acutely toxic, irritants/corrosives, systemic toxicants, toxic gases)
- ☐ Reactive materials (air/water sensitive pyrophoric thermally, shock or friction sensitive, perchlorates)
- ☐ Pesticides
- ☐ Chemicals of "Special Concern" (beryllium, carcinogens, mutagens, fluorine, inter-halogen compounds, lead, asbestos, reproductive hazards, other)
- ☐ Hazardous chemical, Not Otherwise Specified

☐ CONSTRUCTION/MAINTENANCE/ MECHANICAL EQUIPMENT/WORKING SURFACES

- ☐ Construction/demolition (excavations, shoring, underground utilities, asbestos removal, welding, work at heights)
- ☐ Safety system maintenance (deactivated alarms, interlock bypass)
- ☐ Cranes/hoists (critical lifts, high work on cranes)
- ☐ Powered industrial trucks (critical lifts)
- X Machine tools/powder-actuated tools
- X Moving large or heavy items
- ☐ Contaminated equipment (mercury, PCB, radioactive material, lead)
- ☐ Stressed mechanical systems
- ☐ Unusual equipment requiring special approvals (scuba diving, etc.)
- X Walking/working surfaces/heights/falling objects

☐ ELECTRICAL

- ☐ Batteries (with short circuit >10 amps or >50 volts)
- ☐ Capacitors (>10 joules of electrical energy)
- X Electrical power source (>140 volts or >30 amps or containing >10 joules of electrical energy, or systems with 3 or more sources of electrical power.)
- X Energized electrical equipment (work on exposed, energized electrical equipment >50 volts, 20 amps, or an operation using portable equipment at other than ground potential)
- X Static electricity
- ☐ Hi-Potential testing (>500 volts)

☐ EXPLOSIVES/FIREARMS

- ☐ High explosives, propellant, pyrotechnic or other similar energetic material
- ☐ Mock explosive
- ☐ Unstable material
- ☐ Firearms

☐ PRESSURE/NOISE/HAZARDOUS ATMOSPHERES

- ☐ Pressure vessels/systems (low pressure system <1500 psig-liquid or <150 psig gas, pressure system >1500 psig-liquid or >150 psig gas, ≥ 100 kJ stored energy, vacuum systems, cryogenics)
- ☐ Noise (>85dB)
- ☐ Confined spaces (high-hazard, low-hazard)
- ☐ Hazardous atmospheres (asphixiants, hydrogen gas, oxygen deficiency, work requiring a respirator)

☐ WORKER CAPABILITY

- ☐ Lifting manually >30 pounds
- ☐ Work involving repetitive motion
- ☐ Computer use >4 hrs/day
- X Hand Tools
- X Work with mechanical equipment
- ☐ Work alone
- ☐ Work after hours
- ☐ Work in remote locations
- ☐ Work involving individuals <18 years of age
- ☐ Work requiring specific unusual physical capabilities

18. Associated Hazards- Environment, Safety & Health (cont.)

☐ IONIZING/NON-IONIZING RADIATION

- ☐ Non-fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Fissionable radioactive material (encapsulated, non-encapsulated)
- ☐ Radiation-generating devices (RGD)
- ☐ Non-ionizing radiation-lasers/optical (class 1-3A, 3B, 4, UV, visible light, infrared)
- ☐ Magnetic fields >3kHz
- ☐ Radio frequency/microwaves sources >3kHz

☐ TRANSPORTATION

- ☐ Hazardous materials transportation
- ☐ Non-hazardous materials transportation (>routine operations)
- ☐ Use of vehicles (aircrafts, auto/truck/ATV, boat)

☐ WEATHER/TEMPERATURE

- ☐ Weather exposure or temperature extremes (harsh weather, lightening, temperature extremes)

☐ EMERGENCIES/EARTHQUAKES/FIRE

- ☐ Emergencies (unique emergency response situations)
- ☐ Earthquakes (unique seismic safety issues)
- ☐ Fire (unique fire safety issues)

X☐ AIR

- X☐ Discharge to air (air contaminates)

☐ DISCHARGE TO WATER

- ☐ Sanitary sewer/waste water (>routine use requirements)
- ☐ Storm water (>normal impacts)

☐ ECOLOGICAL AND CULTURAL RESOURCES

- ☐ Disturbance to existing structure or area (soils, drainage channel, arroyo, East Gate or Corral Hollow flood plain area, natural habitats, wetlands, undisturbed area)
- ☐ Disturbance to cultural resources

☐ REMEDIATION AND MONITORING

- ☐ Soil (possible impacts)
- ☐ Groundwater (possible impacts)
- ☐ Well drilling or other below ground activities
- ☐ Vegetation (possible impacts)

☐ STORAGE TANKS

- ☐ Retention tank
- ☐ Underground storage tanks

X☐ WASTE


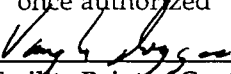

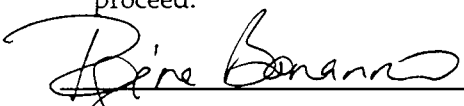
- X☐ Hazardous waste
- ☐ Radioactive waste (mixed waste, waste with no disposal option)
- ☐ Medical waste
- ☐ PCB waste
- ☐ Solid wastes (>routine quantities)

☐ OTHER HAZARDS NOT LISTED

- ☐ List below: _____
- _____
- _____
- _____

| |
|---|
| <p>19. Specific Hazards checked above: (chemicals, materials, isotopes, equipment, trenching, etc.):</p> |
| <p>20. Required ES&H controls: (shielding, interlocks, barriers, gloves, emergency response, respirators, etc.) (See also 27)</p> <p>Follow requirements in construction Safety Program (CSP) for NIF Prepare Job Hazards Analysis (JHA) for Responsible Area Manager ("RI") review Prepare Safe Plan of Action (SPA) daily for Area Construction Manager review OAB clean room level 6 protocol training NIF site access video Follow the requirements of the Bay Area Air Quality Management District permit S-2127 "Wipe Cleaning Permit".</p> |
| <p>21. Required medical certification/surveillance: (laser eye exam, hearing conservation, respirator, etc.)</p> |
| <p>22. Required or recommended ES&H training:</p> |
| <p>23. ES&H Professionals who provided assistance/guidance:</p> |
| <p>24. As the Responsible Individual, I believe the proposed activity/change to an existing activity:</p> <p><input type="checkbox"/> is a common laboratory activity or within the approved safety envelope and does not require any additional ES&H review or procedure.</p> <p>X <input checked="" type="checkbox"/> is adequately covered by our existing controls and documentation delineated below, which will be required reading for all individuals participating in this activity:</p> <p><u>NIF CSP</u></p> <p>_____</p> <p>_____</p> <p><input type="checkbox"/> may require additional ES&H review and documentation</p> <p><input type="checkbox"/> potentially increases or changes the hazard, requires or modifies a permit, increases hazardous waste, or modifies the potential environmental impact.</p> <p><input type="checkbox"/> involves special and unusual activities or equipment not completely covered by our existing ES&H review or documentation. See attachments (list).</p> |

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| <p>25. As the RESPONSIBLE INDIVIDUAL, I have reviewed the hazards and agree to implement the controls identified in the IWS</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  Responsible Individual Signature </div> <div style="width: 45%;"> <div style="text-align: center;">9/12/00</div> Date </div> </div> | |
| <p>26. AUTHORIZING INDIVIDUAL'S work authorization level assesment:</p> <p>Work Authorization Level (circle): <u>(X)</u> 3 4 5 6</p> <p>Additional ES&H documentation needed:</p> <p> <input type="checkbox"/> None <input type="checkbox"/> Hazard Assessment <input type="checkbox"/> SOP <input type="checkbox"/> Level C OSP <input type="checkbox"/> Level B OSP (offsite) <input type="checkbox"/> Level B OSP <input type="checkbox"/> Level A OSP <input type="checkbox"/> SAR/TSR/SAD/OSR/USQ/USI <input checked="" type="checkbox"/> Other (specify JHA/SPA) </p> | |
| <p>27. Additional requirements that need to be met before work can commence:</p> <p style="margin-left: 40px;">Coordinate access to NIF Site with Area Construction Manager.</p> | |
| <p>28. Record of Aurtherization for Work to Begin: IWS No. <u>08220001</u></p> <p><input type="checkbox"/> The proposed work falls withing the safety envelope of the facility/area and may commence once authorized</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  Facility Point of Contact Concurrence </div> <div style="width: 45%;"> <div style="text-align: center;">9/8/2000</div> Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  ES&H Team Leader Concurrence </div> <div style="width: 45%;"> <div style="text-align: center;">9/8/00</div> Date </div> </div> <p><input checked="" type="checkbox"/> The controls have been confirmed to be in place and this proposed activity is authorized to proceed.</p> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">  Authorizing Individual Approval </div> <div style="width: 45%;"> <div style="text-align: center;">9/8/00</div> Date </div> </div> | |

Send copies of this IWS to: the Responsible Individual, Facility Point of Contact, ES&H Team Leader, and payroll supervisors of the employees performing this work activity.

Form Date 3/3/00

April 28, 2000

University of California
Lawrence Livermore National Laboratory
Technical Information Department
Livermore, CA 94551